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How Tungsten Carbide Tools May Influence Machine Design

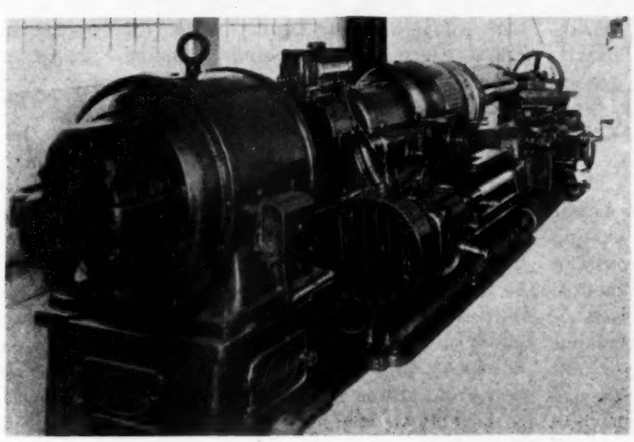
Increased Machine Capacity, Greater Power and Higher Speeds To Be Gained Through Use of This New Alloy

FROM the time when tungsten carbide cutting tool alloys were first introduced in the United States, there has been a constantly increasing demand for information on their performance. Producers and distributors of the new material have co-operated with users, with the result that during the past eight months experience has been gained which clearly indicates the probable trend of influence of the new alloys on the metalworking industry.

It now is apparent that the use of the tungsten carbide tools will affect machine design, will permit machines now employed at only a fraction of their capacity to be utilized to the full extent of their power and speed, and will develop new grinding procedure for dressing tungsten-carbide material. Evidence of these tendencies is cited in much of the literature on the subject emanating from the companies identified with the production and sale of the alloys.

E. G. Gilson and G. N. Dreger, Carboloy Co., New York, commented on the effect of tungsten - carbide tools on machine design in a paper presented at Chicago, March 18, before the Chicago section of the American Society of Mechanical Engineers. They illustrated a welded cast iron sashweight that had been machined with carboloy and attributed the rough cutting shown to "inadequate tool support or lack of strength in the tool carriage." The ordinary tool post or tool clamp, they state, is a serious offender in this respect. They cited cases where it is necessary for the best performance of cemented tungsten-carbide tools to remove the cross compound slide completely and build up directly from the tool carriage with a solid bolster and tool clamps.

The tail stock center also is a source of trouble. These authors declare that in lathe work where the tailstock center is used, either adequate means of lubricating the present type of dead center must be developed or a type of live center must be found to take its place. At the present time no adequate way of lubricating the dead center has been discovered and no live center tested has been equal to the job. The most serious objection to the live center has been the chatter of the work. In using carboloy tools on work which must be turned between centers, the problem of the tailstock center, while apparently of minor importance is really a serious one, and attention



Photos courtesy Thomas Prosser & Son

Fig. 1—Powerful, rigid lathe built for Krupp works to demonstrate full capabilities of widia tool alloy

should, by all means, be called to it.

Messrs. Gilson and Dreger also point to the fact that high-speed operation—very much higher than present practice—brings into consideration other factors of machine-tool design, an outstanding example of which is bearings. Many cases of chatter or vibration originate in the "head" of the machine, particularly in the bearings. This emphasizes the need for better bearings, both in design of the bearing proper as well as lubrication. When operating at the increased speeds necessary for the most economical use of the cemented tungsten-carbide tools, lubrication of present-day machine tools is entirely inadequate. Many cases have developed in which the limitation was reduced but more work is done per unit of time.

Rigidity Is Important Factor

The rigidity of all power-transmitting members is of prime importance. Gears must be smooth running, well balanced, and of ample strength. Power application should be made close to rigid support members and never on a shaft midway between bearing supports. The design of power-transmitting shafts should be so ample that all torque vibration is eliminated. With due attention given to these details, together with properly designed and lubricated bearings, as mentioned above, economic employment of carboloy should be in order.

The effect of tungsten-carbide tools far more than slow speeds toward producing minute and rapid vibrations in all parts of the machine, and these vibrations are best opposed and absorbed by having large masses of metal supporting the cutting tool and the head and tail stocks. It is largely for the purpose of avoiding vibration and chatter in machines that the high cutting speeds accompanying the modern high speed tools call for a redesigning of our machine tools. While it is true that in many cases a very great gain can be made by merely speeding up a machine originally designed for slow speed tools, this increase in speed almost invariably produces a corresponding increase in the vibration or chatter, and for absorbing this, the lathes and machines of older design are, in many cases, too light throughout".

Figs. 2 and 3—Cast iron test log in demonstration lathe at Krupp works. The pieces are 12 inches in diameter with two cast slots each 1⅜ inches wide. Brinell hardness 220. Machined at surface speed of 655 feet per minute; depth of cut, 0.59-inch; feed, 0.036-inch

the lack of lubrication of the bearings of the machine being used. Better materials should be used in the bearings, better fits are necessary, and thorough lubrication must be assured. This means that it is practically necessary to redesign the power-transmitting members of many types of machines.

Greater Power Required

It is also evident that more power must be transmitted to the cutting point of these new tools, according to these authorities. A cemented tungsten-carbide tool is used because of its greater output per machine. Thus, more metal is removed per unit of time, and this in turn increases power consumption. This increase, which may be as much as 100 per cent, obviously must be transmitted from the driving medium to the tool point. It should be repeated that the power per unit of metal removed may be

on machine design also is discussed by W. E. Guild of Thomas Prosser & Son, distributors in the United States of widia, the tungsten-carbide tool alloy of the Krupp works of Essen, Germany. Mr. Guild, speaking before the metropolitan section of the division on machine shop practice of the American Society of Mechanical Engineers, said that cutting tools again are in advance of machine tool design, and that many of the machine tool manufacturers here and abroad are busy designing equipment which will be able to make full use of the possibilities of widia. Fig. 1 shows the powerful and rigid lathe which it was necessary to build for the demonstration room at the Krupp works in order to be able to exhibit the full capabilities of the new material.

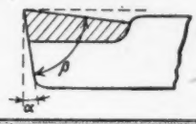
Frederick W. Taylor in his classic treatise "On the Art of Cutting Metals" published in 1906, says: "Undoubtedly high cutting speeds tend

This is as true now as it was then, and important development can be expected in machine tools in the near future, according to Mr. Guild.

Full Capacity Not Attained

At the present time, however, every machine shop is full of machines which are not being run to anything like their full capacity. They can be speeded up considerably, and there is usually plenty of power available. These are the places where Widia can save money, without the necessity of purchasing new machine tools.

Mr. Guild also presented valuable suggestions on the use of tungsten-carbide tools. When the chip pressure on the tool approaches the maximum allowance with high-speed steel, it is necessary to make provision for a proper reduction in the pressure, if it is desired to speed up production



Materials to be worked	Tensile strength or Hardness	Clearance angle α	Tool angle β
Steel	40—90 tons sq. in.	6—8°	65—70°
Steel	28—40 tons sq. in.	8—12°	58°
High Silicon Cast Iron (up to 15% Si)		3—5°	80—84°
12% Manganese Steel		6—8°	70°
Rustless Steel		6—8°	60—68°
Chilled Cast iron	75—90 Shore	2—4°	82—86°
Steel Castings	30—65 tons sq. in.	6—8°	60—75°
Grey cast iron	150—400 Brinell	6—8°	70—75°
Bronze, Brass &c.		8°	70—75°
Light Alloys		8°	60—65°

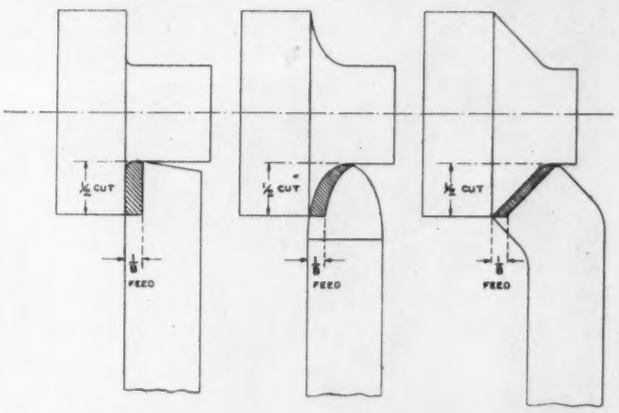


Fig. 4—Tool shapes for turning, boring and milling materials with widia. Fig. 5—Pressure on various shapes of tools

by replacing the high-speed steel tools with widia. This reduction in pressure, says Mr. Guild, can be accomplished by using finer feeds, or by the use of a different form of tool. A somewhat decreased feed will often permit the use of a greatly increased cutting speed.

Fig. 5 shows the corresponding pressures on three different forms of tools, each taking the same cut and feed. For heavy work, it is desirable to use a tool whose cutting edge enters the work at an angle of about 45 degrees. In many instances this will be difficult or impossible, due to the necessity of cutting up to a shoulder, etc., but it should be borne in mind.

The clearance angle of the tool should be kept within reasonable limits, so that the cutting edge will be properly supported by the steel of the shank. Proper tool angles for machining various materials are shown in Fig. 4. The tool angle B refers to the actual cutting lip, and may be on the front or side of the tool, depending on the direction in which the tool is to cut. In addition, a side slope or back rake—depending on the direction of cut—shouid be ground on the tool.

Fig. 6 shows the angles recommended by Mr. Guild for planing or shaping. For this service, it is necessary that the tool be lifted from the work on the return stroke, otherwise there is danger of breaking off the fine cutting edge. This further emphasizes the necessity for supporting the tool edge.

Conditions Govern Feeds and Cuts

It should not be concluded from the above that it is not possible to use heavy feeds and cuts with tungsten carbide tools. On the contrary, it is possible to take very heavy cuts under the proper conditions, even when the cuts are interrupted. For example, 0.35 per cent carbon steel can be cut at 100 feet per minute, 0.2 inch cut, and 0.16 inch feed, or 200 feet per minute, 0.4 inch cut and 0.060 inch feed. Chrome nickel steel, 3½ per cent nickel, 1½ per cent chrome, 140,000 pounds per square inch tensile strength, can be cut at 65 feet per minute, 0.16 inch cut, and 0.160 inch feed, or 150 feet per minute, 0.4 inch cut and 0.40-inch feed.

The above will give an idea of the feeds and cuts which can be taken at high speeds. In general, however, the principle of "light feeds and high speeds" should be borne in mind.

It is essential to have plenty of power and to maintain the speed of the machine. Slowing down in the cut, vibration and chattering, are conditions to be avoided. The machine should never be stopped with the tool in the cut and the feed on, as there is danger of breaking the widia tip under these conditions. Widia tools should be held short and firmly, and should be supported as near as possible to the cutting edge, avoiding the tool posts with the sliding radial sup-

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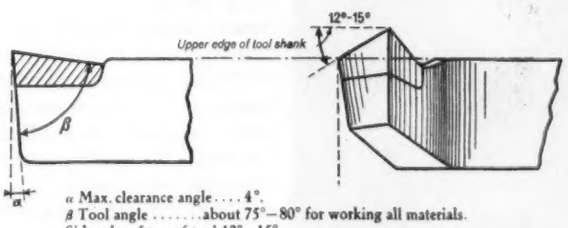
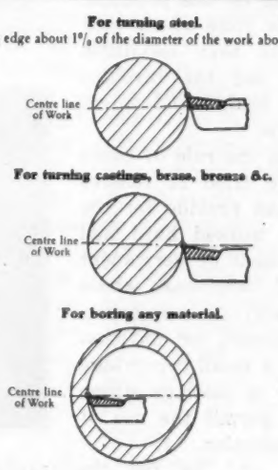
Fig. 6 (Below)—Tool shapes for planing with widia. Fig. 7 (Right)—Setting of the tool when working with widia tools


12°-15°
Upper edge of tool shank
β
α
α Max. clearance angle .... 4°.
β Tool angle .....about 75°—80° for working all materials.
Side rake of top of tool 12°—15°.


For turning steel.
Cutting edge about 1% of the diameter of the work above centre.
Centre line of Work
For turning castings, brass, bronze &c.
Centre line of Work
For boring any material.
Centre line of Work

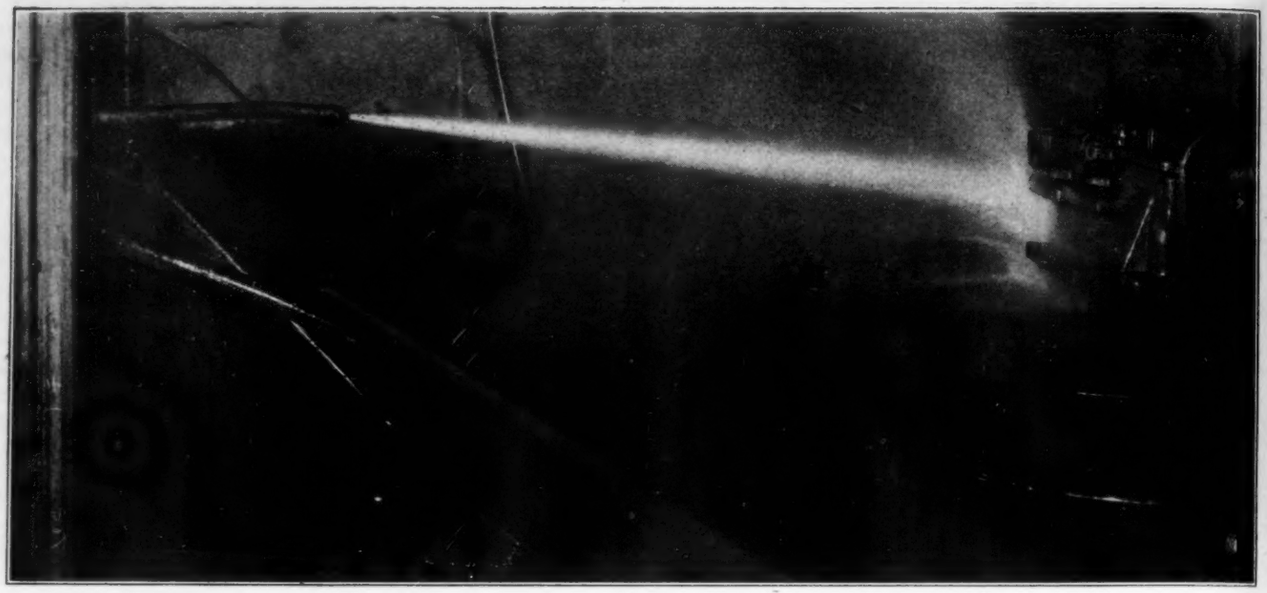


Fig. 1—The hydraulic abrasive cleaning chamber is illuminated with flood lights

Cleaning Castings Successfully with Stream of Sand and Water

By E. A. Custer Jr.

PROBABLY no feature in the production of a metallic casting has caused so much worry, annoyance and vexation as that of getting it properly cleaned. The nature of the operation is anything but inviting. The dirt, the refuse, the difficulty and the class of men that are forced by circumstance or necessity to engage in this occupation, all tend to create a feeling of repugnance.

Castings must be cleaned. The cleaner they are the greater is the satisfaction of all concerned, and the better the reputation of the producer and his foundry. In spite of its lack of attraction, it has been inevitable that the engineer and the inventor should apply their brains and talent to solve this problem.

Some have applied the rule of cause and effect and have tried to remove the cause rather than provide for the effect. They have worked hard and long in the development of permanent molds, metallic and otherwise, where no sand was necessary. To a measure, they have tasted success, but obviously, there can be but a small percentage of the total number of castings whose size or design will permit the use of that method of production.

Other engineers, and by far the greater number, have devoted themselves to the development of means of handling the effect, and many and ingenious are their productions.

Engineers have worked long and hard in developing the equipment now used in the cleaning room. The hand hammer and chisel gave way to the pneumatic and electric hammers, so prevalent in every foundry today. Use of compressed air, in another field suggested the sandblast. The stream of air, carrying particles of sharp, hard sand, cuts even the most refractory burnt sand with ease.

Many adaptations of the sandblast principle followed. Cabinets, revolving barrels, turntables, conveyors and elaborate machines were designed to dispense with the operator and present the various faces of the castings to the stream of sand.

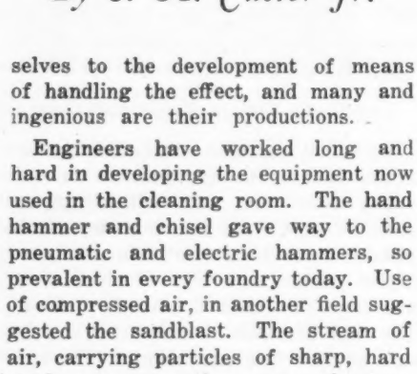


Fig. 2—Hole drilled through a ½-inch steel plate at a distance of 6 feet

While this development of the sandblast was going on, engineers were working in still another field and the hydraulic washers of castings were developed. These units, designed and used almost exclusively for large, heavily cored castings, found favor in the savings they effected in the removal of cores. The high pressure streams of water ripped out sand, rods and gaggers. Sand adhering to the surfaces of the casting was whisked off with one movement of the nozzle, provided the sand was not burned to the metal. Neither pressure nor duration of application of the stream of water would remove sand in that condition.

These washers salvaged rods and gaggers in the same shape as when first applied, thus facilitating their re-use. They eliminated the labor of digging out cores.

Separate and distinct from the problem of cleaning, yet in a measure related to it, engineers were working in another field; that of producing a correct molding sand. They knew that all natural molding sands varied more

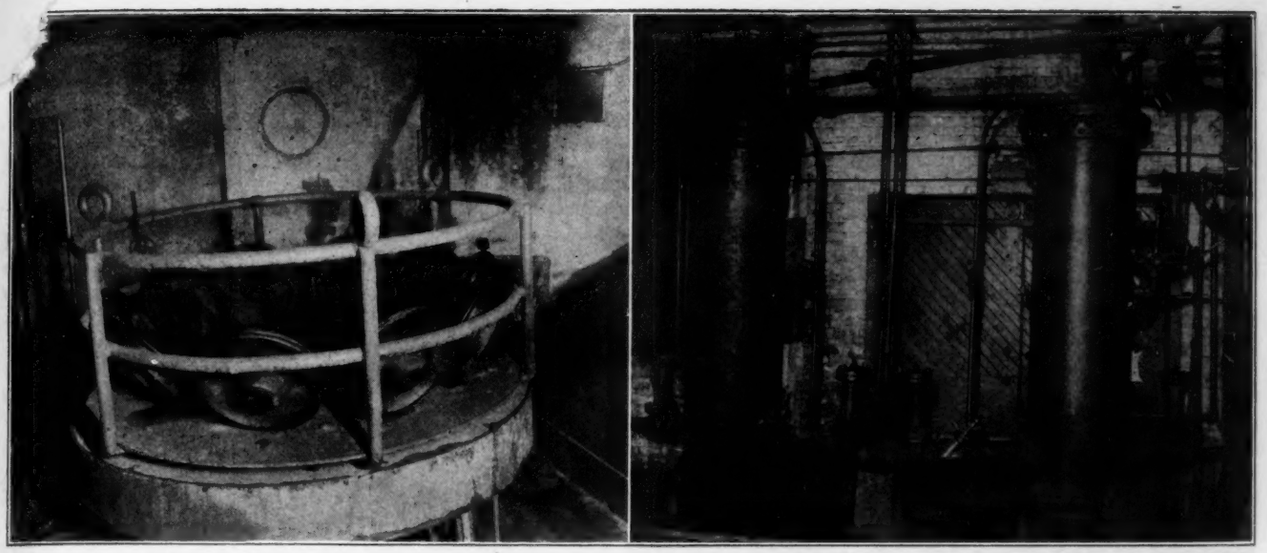


Fig. 3—Small castings are inclosed in a basket that may be lifted on and off the turntable. Fig. 4—Hydraulically operated valves with four-way control are so designed that there is no interruption or pulsation when the supply is switched from one to the other

or less depending upon bed location, depth of strata or other factors of their original formation. This led to the creation and use in numerous places, of a synthetic sand. A sand built up from the clean white silica sand, properly bonded, humidified and blended for each specific use. This introduced a new problem in the cleaning room. In many places, particularly some of the steel foundries, the reclaimed sand is desired in the form of the white silica sand alone so that all sand used for molding can be mixed to one standard.

Washer Developed to Fill Need

Thus the engineers, still working on the problems of cleaning the castings were confronted with the task of combining the speed of the washer with the efficiency of the sandblast, and at the same time provide for washing the sand itself to render it suitable for re-use.

They have succeeded. They have worked over the problem for the better part of two years and now give to the foundrymen the latest development, the hydraulic abrasive washer.

This new method originated and developed at the plant of the Whiting Corp., Harvey, Ill., simply combines the powerful streams of water with the abrasive action of sand. Actual combining of sand and water; means of putting both sand and water under pressure; cutting action of the sand on valves and controls; manipulating the nozzles; each presented a problem in itself, but all have been solved in a gratifying manner by the members of Whiting Corp. engineering staff.

The new device resembles the familiar pressure washers with the same steel rooms and the usual turntable in the center; the same settling basins where sand and water are segregated; the same mode of application, but better results.

In the early development of the abrasive washer it was apparent at once that the mixture of sand and water could not be passed through pumps to put it under pressure. The abrasive action quickly would cut out any pump, plunger or centrifugal. The siphon action of eductors was tried next and at once proved effective in mixing the sand and water, but the eductors alone would not do. A pressure of 500 pounds on an eductor such as had to be used would give only a theoretical discharge of 175 pounds. This low pressure is not sufficient to tear into cores nor to give the high abrasive action desired. The sand mixture itself had to be placed under pressure and this finally was accomplished by a large pressure tank. One tank caused an intermittent delay of 10 minutes or more each time the tank had to be refilled. This delay was overcome by the installation of a second tank. One fills while the other discharges under the control of an ingenious four-way valve. This insures a continuous supply to the nozzle.

Then came the question of abrasion. The sandblast had amply demonstrated the cutting power of sand when propelled by air under a nozzle pressure that rarely exceeds 50 pounds. The best of the sandblast nozzles seldom lasted more than a day. How much greater would be this wear when the pressure was jumped to 500 pounds was a matter of conjecture, but actual operation disclosed a surprising and gratifying fact. When a mixture of sand and water in which the water content is the greater, is propelled at high velocity, the sand collects in the center of the stream and the water acts as a sheath around it. The nozzles on the abrasive washer show little wear and their life is measured in weeks instead of hours. Similarly the piping and hose serve over a long period.

Wear showed only where the direction of the stream was changed abruptly in elbows and tees. When these sharp turns were displaced with wide swinging curves the wear was reduced. The same action of the sand and water seemed to hold true in the valves. When a valve that would not jam was developed finally, the question of wear was solved. Liners of the eductors wear to a considerable extent but they are replaceable. Replacements are necessary only about every two months.

New Method Simple, Easy, Positive

The present hydraulic abrasive washer presents a unit that is comparatively simple, easy to understand and operate, and positive in action. A steel room is equipped with a door, or doors, in the ends, sides, top or all faces as the individual needs require. The castings are placed on a revolving table in the center of the room. This table may be fixed and the castings lowered upon it through the roof of the room, or it may be mounted on a truck and moved into the room through a side or end door. Movement of the table is controlled for either rotation or longitudal motion by valves at the operator's station. By a simple turn of his wrist he can move the table in or out or revolve it to present any face of the casting toward the nozzle.

A motor driven centrifugal pump

located in a separate housing back of the washing room delivers the required amount and pressure of water. This water may be delivered to the nozzle direct for pressure washing or rinsing of castings. When the sand abrasive action is desired the water is passed through semi-eductors in the base of either one tank or the other. Here the water, under 500 pounds pressure picks up the sand also under the same pressure, folds around it until the sand is centered like the lead in a pencil, and carries it to the nozzle.

The nozzle is mounted on a movable rack so that it may be raised or lowered by a simple twist of a valve, to any position from roof to floor. The nozzle is connected to the rack with a universal joint that permits free movement of the nozzle in any direction.

Water, sand, gaggers, everything loose, is washed across the sloping floor of the room to the first of a series of tanks in the floor. A vibrating screen over the tank catches gaggers, rods, nails, etc., while the sand and water drop through into the tank. From here the sand is picked up by low pressure eductors and delivered either to the two tanks for re-use as abrasive or to drainage and sand driers for reconditioning for the foundry. The water passes from tank to tank over a series of wiers until it is clear for re-use. In the second last tank fine coke acts as a filter for any fine silt that may have passed over. The pump draws from the last tank in this self supporting unit needing neither new sand aditions nor additional water.

Has Remarkable Cutting Power

The hydraulic abrasive washer will cut through burned sand on a steel casting; remove scale and rust, paint, or the metal itself if the application is maintained at one point. The water seems to not only carry the sand to the casting but to literally hold it there and rub it across the surface. The cutting power is that of sand traveling with all the velocity of 500 pounds pressure. It will do just as effective work 6 feet or more from the nozzle as at 1 foot. This is demonstrated daily and the necessity no longer exists of keeping the nozzle close to the work. The cutting power of the stream is illustrated in the illustration Fig. 2. A steel plate, ½-inch thick, was placed 6 feet from the nozzle and drilled entirely through in 6 minutes.

If rusting is objectionable it is easily prevented by the addition to the water supply of about two buckets of an anti-rust solution each day. Castings cleaned when this solution was used have failed to rust although exposed to the weather for weeks.

The violent scrubbing action of the sand not only cleans the castings but also cleans the sand itself. As it comes from the washer it is free f bond or carbon and when freed fr the excess water is ready for recon ditioning.

Research on Wire Rope Under Consideration

A co-operative investigation of properties and use of wire rope to be conducted under the auspices of the American Society of Mechanical Engineers, is being urged by representative manufacturers and users of this product. No well substantiated facts by which to protect the life of this widely used material or to establish standards for its use appear to exist. To forestall risk of failure, therefore, thousands of feet of wire rope are being discarded each year long before useful life is completed. Greater knowledge apparently is needed.

The New York Building Owners and Managers association and the Engineering Foundation have already given substantial aid in the development of the project and have promised further support. W. H. Fulweiler, member of the A.S.M.E. main research committee, stated that a small committee will be appointed to prepare a suggested program of research for wide distribution and comment. Following this a large and more formal conference will be called of all interested to crystallize the project for conduct by a committee.

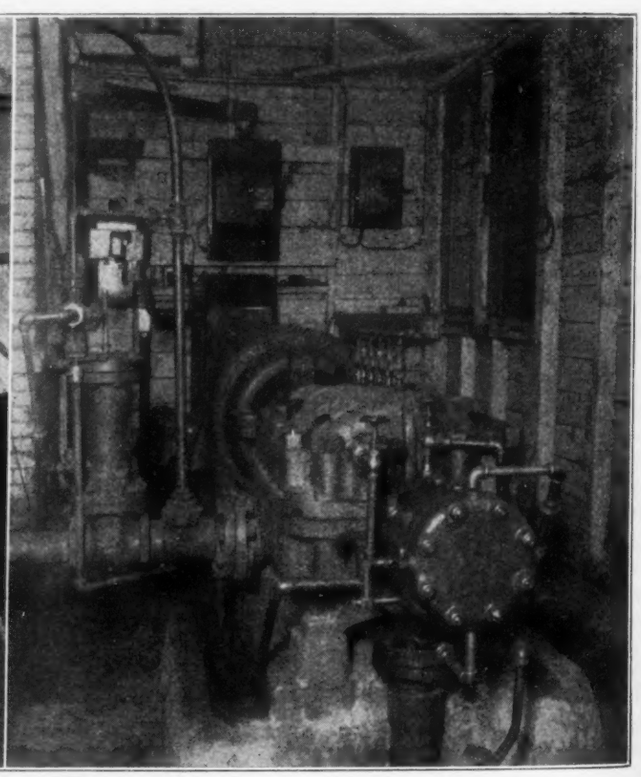
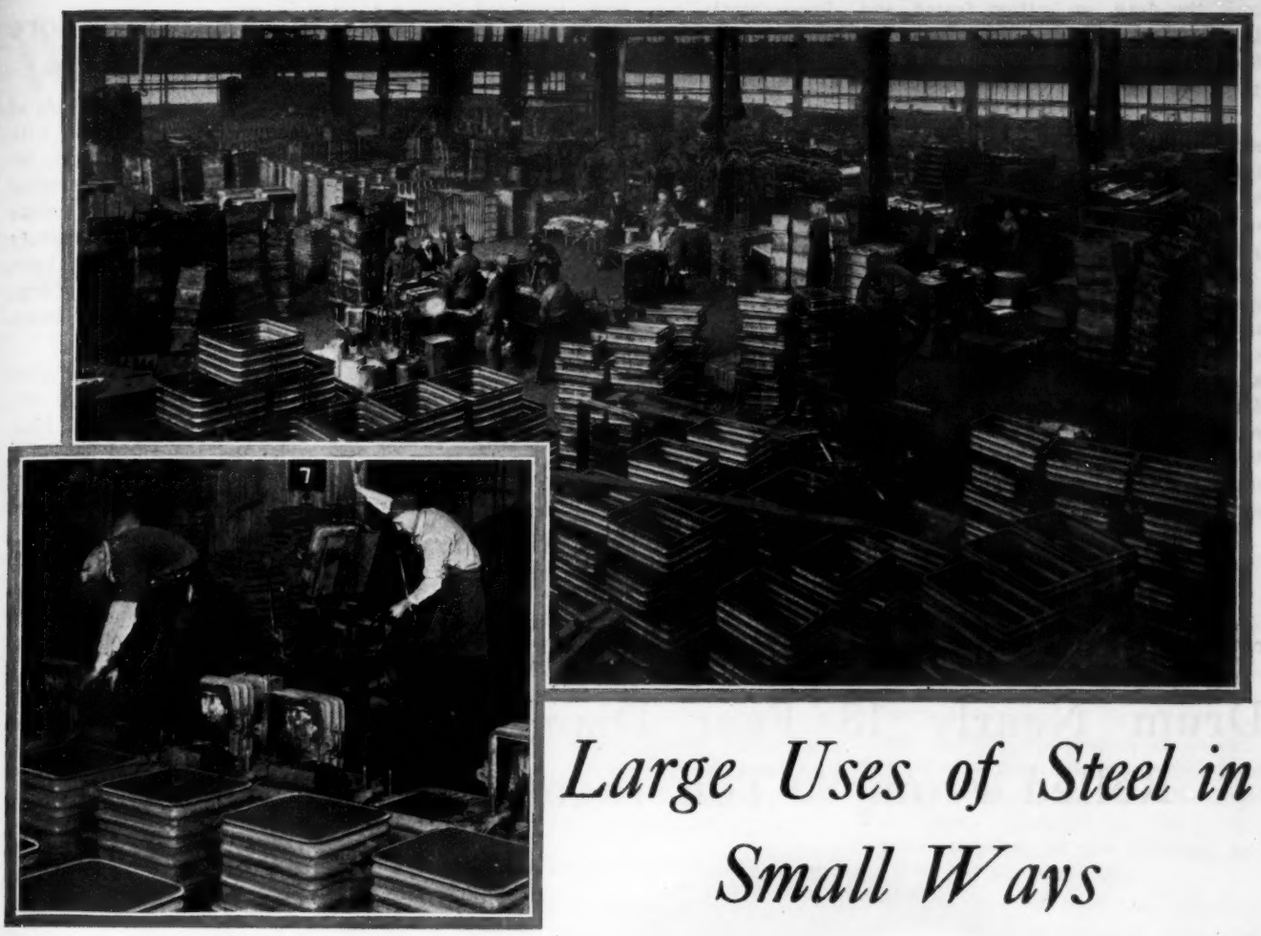


Fig. 5—Nozzle with universal joint may be raised or lowered on the rack shown to the left. Fig. 6—Hydraulically operated valve at the left controls feed to pressure tank and opens or closes automatically as the motor is turned on or shut off



Above, making flasks with welding machines. Below, using the flasks with molding machines

Large Uses of Steel in Small Ways

139th Article—Foundry Flasks

THE manufacture of foundry flasks consumes 20,000 tons of steel annually in the United States, according to an estimate made by one of the leading companies making them. Flasks are subjected to rough usage, and while some of the improved types have been in service four years or more, there is a steady demand for new units for replacement. The number of foundries in the United States using flasks is approximately 5600. Some have only a few, and others many thousands.

A study of the market for flasks leads one manufacturer to estimate an average of 500 to a foundry. This indicates a total of 2,800,000, and the same authority believes about 25 per cent, or 700,000, of all the flasks in use are made of wood or other material. The average weight of the steel flasks is computed at about 100 pounds, of which 10 per cent is represented by castings, principally malleables. On this basis, the steel contained in foundry flasks now in service figures out to around 95,000 tons. The estimate of 20,000 tons of steel absorbed annually in the making of flasks include those manufactured by large foundries for their own use.

The advantages of steel over wood in foundry flasks are lightness, which is an important factor in considering handling costs; rigidity, to withstand rough usage, and accuracy necessary to make uniform castings with a minimum of scrap. Lightness and rigidity are obtained by using high-grade, but light-weight, steel, and eliminating heavy walls by means of ribbing and flanging the material. These steel flasks are made with high-grade equipment, and the pin lugs necessary for the assembly of the cope and drag are drilled with accurate templets.

Steel for Strength, Accuracy

Lightness, rigidity and accuracy are considered such important requirements in mass production methods that practically no wood flasks now are in use in production work.

The steel used by leading manufacturers of flasks is open-hearth, medium blue annealed, in the form of plates, and some makers use a copper-bearing steel to resist corrosion. The plates vary in thickness from ⅛ to ½-inch or more. They are first cut to required sizes, and the blanks are taken to forming presses where ribs are stamped in them on about 3-inch centers. The top half of each rib is made with a steep slope that the sand will slide in position easily when the flask is in service, and the bottom half of each rib is made shallow and acts as a shoulder upon which the sand rests.

After the ribs and flanges have been formed in the sections the next operation is to turn the corners. Two sections are then brought together in an electric welding machine and forced together tightly while they are welded. The result is a square or oblong frame, with corrugations and flanges joined perfectly. In succeeding operations handles and dowel brackets or lugs are riveted or welded in place, and the holes for the dowel pins are drilled accurately so that when the cope, or top frame, is placed

over the drag, or bottom frame, and the dowel pins inserted in the brackets there is perfect alignment of the two parts of the mold.

In the copes of some of the flasks steel cross pieces are welded in place, the cross pieces having holes punched or drilled through them, the purpose of these being to hold the sand in place.

While there are many shapes and sizes of foundry flasks and different methods of constructing them to meet special purposes, flasks are fairly well standardized for the average jobbing foundry. Such a foundry will have a half dozen sizes, 18 x 18 inches up to 36 x 36 inches. Smaller sizes are made for brass and nonferrous foundries.

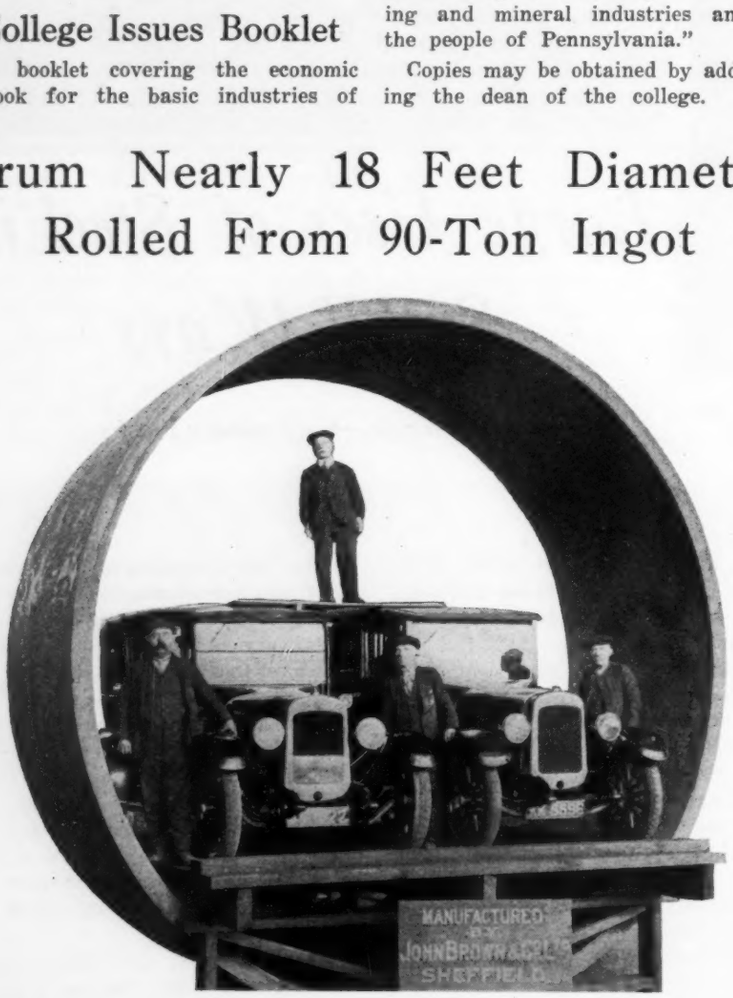
College Issues Booklet

A booklet covering the economic outlook for the basic industries of Pennsylvania has been prepared by the school of mines and metallurgy of Pennsylvania State college. In the foreword of the booklet, Howard Steidle, dean of the college, explains that the review has been prepared to promote the mining and mineral industries of the state and to cultivate more favorable public opinion regarding them.

"The first part," he continues, "covers the great economic importance of the mining and mineral industries, and the urgent need for more technical application; the second part tells of the advisory board program which serves as a connecting link between state industry and state education; and the third part outlines the service that Pennsylvania State college is rendering to the mining and mineral industries and to the people of Pennsylvania."

Copies may be obtained by addressing the dean of the college.

Drum Nearly 18 Feet Diameter Rolled From 90-Ton Ingot



PRODUCTION of large rolled steel drums is a recent development in the British steel industry. John Brown & Co. Ltd., Sheffield, Eng., have made one with an outside diameter 17 feet 8 inches. It is 8 feet 3 inches long and the wall is 5⅞ inches thick. The drum weighs 42 tons, and is believed to be the largest ever produced. It was rolled from an ingot having a total weight of 90 tons, and a mean section of 80 inches, octagon. This was subsequently rounded up under a 6000-ton forging press to 73 inches outside diameter, after which it was machined and trepanned to a suitable size for reforging. The thickness of this machined piece was next reduced by further expanding under the 6000-ton press. Next came the hollow rolling by which the drum was expanded to its full diameter.

Airship Factory Doors Mounted on Trucks

The contract for the manufacture of the door operating mechanism, with the supporting trucks and hinges, including the supplying of the electrical equipment therefor, for the unique doors of the largest airship factory in the world now being built at Akron, O., by the Goodyear Zeppelin Corp., has been awarded to the Wellman-Seaver-Morgan Co., Cleveland.

The factory itself is of sufficient size to house two airships, side by side, being approximately 1200 feet long, 325 feet wide, and about 200 feet high at the center. Each end of the building has two doors of structural surfaces, curved substantially like a quarter section of an orange peel.

Each of four doors weighs approximately 1,500,000 pounds and is supported on ten, 4-wheel trucks. The latter are built radial to run on a curved track having a radius of approximately 188 feet so that when the doors are in full open position they stand in a plane paralleling and close to the side of the building. The door speed of travel is about 40 feet a minute and to either open or close them requires five minutes. The doors will be operated independently and the control mechanism will be located in an operator's house outside of each door. Provision is made against too sudden stopping of the doors at any position and for a slow, creeping speed as the ends of travel are approached.

The Wellman company is doing this work in accordance with plans and specifications of the Goodyear Zeppelin Corp. as furnished by their engineers, Wilbur Watson & Associates with F. E. Hulett as consulting mechanical engineer.

Fact Book of Industry Lists Fabricators

Skyscrapers are no longer indigenous to the few largest cities of the United States but they now are being constructed in towns and villages throughout the country. This activity has resulted in such a wide interest in fabrication of structural steel that the American Institute of Steel Construction Inc. has just published a "Fact Book of the Industry."

The publication, which is just coming off the press, will list the steel fabricators of the United States, Canada, Mexico and Hawaii. It will present in chart and tables the statistics of steel fabrication and construction work.

Welding Responsible for Increase in the Use of Sheet Steel

Authority on Manufacture of Automobile Bodies Anticipates Even Greater Application of Welded Fabricated Designs in Future

THE art of welding is progressing with amazing rapidity in this country, according to an address before the Philadelphia section of the American Welding society, April 15, by Joseph W. Meadowcroft, assistant works manager, Edward G. Budd Mfg. Co., Philadelphia, vice president, American Welding society and spokesman for that society at the World's Engineering congress to be held in Tokio, in October, 1929.

Great changes have come about in the applications of welding in the last few years. Within a short time, the number of spot welds in a particular automobile body has been reduced from 1107 to 125. Further immediate progress is so clearly indicated that he expects a good many new developments in automobile body welding alone in the next six months.

A recent development which is stimulating the **sale of all steel** bodies, he said, is the discovery of a method of producing steel doors which, when slammed shut, do not give forth the metallic sound which hitherto has caused some criticism. By employing clinch-flanged welded joints, the steel doors close with the soft dull thud characteristic of composite doors.

Wider Sheets Aid Development

The recent development in the sheet industry, whereby three mills now are able to furnish sheets 66 inches wide, said Mr. Meadowcroft, has made much of the recent development possible. He showed slide views of body panels stamped out of a single sheet, welded to rear and front panels also stamped out in units. Because of the fact that such wide sheets now are obtainable he looks for a great development in the stamping industry. Mr. Meadowcroft also showed views of the machines recently installed at the Budd plant whereby the side and rear panels of bodies are flash-welded with joints 57 inches long, with the weld stronger than the steel in the body.

A development which Mr. Meadowcroft expects within the next five years is the production of light structural members, rolled with projections, so that they may be joined in the field by means of resistance welding. He expects early application of joining by welding in the case of transmission tower construction.

He cited the case of a radio manufacturer which last year stamped its radio boxes in a unit, out of steel sheets especially made for deep drawing. Because of the high upkeep in connection with the dies, the manufacturer has had to resort to making these boxes in two pieces, which are joined by welding, and the weld is so perfect, said Mr. Meadowcroft, that it scarcely can be detected.

Broadening Uses of Steel

The welding engineer, he declared, is largely responsible for the great increase in the use of sheet steel in recent years. This development is bound to increase, so that the development of welded fabricated designs will bring about further increases in the demand for sheet steel.

Another result of the increased use of welding in producing all steel automobile bodies and other welded structures which Mr. Meadowcroft foresees is the stimulation of demand for the services of job-welding shops all over the country. When welded steel automobiles are damaged, for instance, they will have to be repaired with welding apparatus. The present growth in the use of welding, he thought, is creating opportunities for many individuals to set up job-welding shops which will have a prosperous future.

R. D. Thomas, president, R. D. Thomas & Co., Philadelphia, terminated a period of two and one-half years as chairman of the Philadelphia chapter of the American Welding society at this meeting. He is succeeded as chairman by John J. Dunne, Paschall Oxygen Co., Philadelphia. L. H. Christensen, Heintz Mfg. Co., Philadelphia, was elected vice chairman. H. E. Hopkins was re-elected secretary and C. W. Bates, Philadelphia Electric Co., was re-elected treasurer. Joseph W. Meadowcroft, Edward G. Budd Mfg. Co., and Charles M. Rusk, R. D. Thomas & Co., were elected to the executive committee.

Using Steam To Remove Rust from Pipes

Some 50 representatives of the United States Steel Corp., National Tube Co., Building Managers and Owners Association of New York, and others recently witnessed a demonstration of cleaning rust from steel pipe with steam in the Equitable building, New York. Clarence T. Coley, operating manager of the building, arranged the demonstration.

A vertical steel pipe line 3 inches in diameter and extending from the sub-subbasement to the thirty-fifth floor, a distance of 500 feet is said to have been cleaned in one hour of all rust incrustrations resulting from 15 years' use. Briefly, the method is to fill the pipe with steam for about 15 minutes, thus heating it for its full length. This is followed by flushing with cold water which washes down the loosened iron oxide. This procedure is repeated as many times as necessary. Engineers of the Equitable building for some time have been experimenting in the cleaning of various sizes of steel pipe lines using steam pressures ranging from atmospheric to 150 pounds per square inch. Thus far, great success has been realized in cleaning 2500 feet of pipe, ranging in lengths from 250 to 500 feet.

The original theory in the use of steam was that the velocity would remove the rust by erosion. However, this effect can be realized in only a short length of pipe. What now is thought to occur is the expansion of the pipe wall by heat and the contraction of the rust incrustation by drying in the heat of the steam. This breaks the rust away from the pipe so that the rush of water may wash it out. The repeated action succeeds in breaking out all rust down to the actual pitted pipe wall.

Employs Return Flue Gas System for Firing Annealing Ovens

Fractures of Iron Disclose Definite Equilibrium Between Metallic Constituents and Furnace Atmosphere

By W. J. Graham

Technical Division, Ohio Brass Co.

OPERATION of furnaces for annealing malleable iron presents in many aspects a problem peculiar to itself in the art of heat treatment of metals. The foundryman is faced with maintaining an evenly distributed, controlled temperature in a heating chamber containing a relatively large tonnage of material. The desired change in the character of the carbon content of the iron is influenced not only by the temperature and its distribution, but also by the rate of heat input and the rate of cooling of the charge. Furthermore, the atmosphere of the furnace seems to have a great influence on the decarbonization of the surface of the metal through its bearing on the equilibrium of the iron-carbon-oxygen system. Additional factors entering into the problem are the life of the refractories, disintegration of annealing pots by oxidation and fuel consumption. These enter into the cost of the annealing operation in an important way.

In this paper it is attempted to record as a preliminary report a method of firing malleable cast iron annealing furnaces. This method has been applied with a considerable degree of success to two furnaces within the past eighteen months at the Ohio Brass Co., Mansfield. O. The presentation of data is confined to a description of design of apparatus, the method of firing and the results obtained to date. This method of firing was applied to furnaces of the oven type fired with powdered coal.

In July, 1927, a new bank of annealing furnaces was put into operation. In designing these furnaces, the engineers provided ample insulation to prevent heat losses. Rather careful studies were made of the firing program and it developed that while it could be made satisfactory from the standpoint of uniformity of temperature and its control, it was almost impossible to approach a neutral atmosphere during the holding period and maintain, at the same time, uniform temperature. The reason for this condition seemed to be that the rate of heat dissipation through the furnace walls was so low that unless the flame was cooled by a considerable air excess, one of two effects would be observed: Either the temperature of the rear of the furnace would be too high or, if the volume of burner gases was reduced, there would not be sufficient gas carried forward in the chamber to evenly distribute the heat to the front end.

Atmosphere Control Beneficial

While the efficiency of these furnaces was satisfactory and the annealed iron met all requirements, it was felt that if it were possible to control the character of the furnace atmosphere, many beneficial effects would accure. Before two more furnaces were put into operation in May, 1928, it was proposed to return to the furnace chamber some of the waste gases or products of combustion in order to provide greater gas volume, or pressure within the furnace.

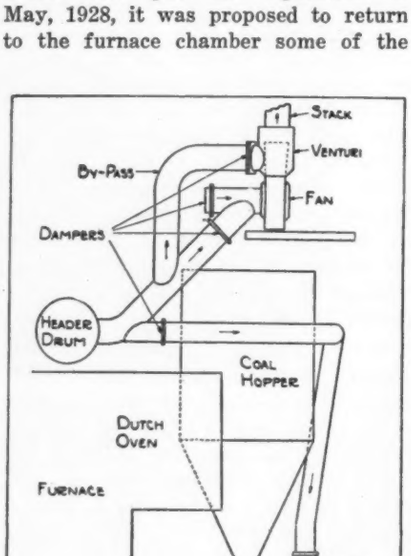


Fig. 1—Detail of flue arrangement

A section showing flue arrangement of the Grindle designed furnaces, and overall dimensions is given in Fig. 2.

The return of the waste or flue gases was accomplished in three stages of experimentation. The first trial was made with gas returned from the flue above the drum on top of the furnace to an opening in about the center of the roof. The results were unsatisfactory, and even disastrous to the pots located immediately under the opening, as apparently a secondary local combustion took place here.

It then was decided to return the gases through the carburetor and burner. Accordingly, a pipe was run from a point on the flue above the exhaust fan to a mixing chamber between the air inlet gate and the carburetor. This pipe was led out of the flue at 4 inches diameter, expanding to 10 inches diameter, as it was thought at the time that it would be necessary to cool the return gas somewhat. A damper above the mixing chamber and one in the stack with the previously mentioned construction controlled the amount of return gas that was mixed with the inlet air.

After a number of trials during several annealing cycles, it was found that an appreciable amount of returned gas could be mixed with the inlet air. The exhaust fan could be shut off during the holding period and the oxygen content of the furnace atmosphere reduced from 8 to 10 per cent to under 1 per cent. The carbon dioxide content was 18 to 20 per cent. The temperature of the furnace was easy to control and there was a uniform condition of temperature as indicated by the front and back thermocouples. The annealed iron was excellent in quality as indicated by many fractures, showing little "picture-frame" effect.

The previously mentioned flue arrangements were made on No. 5 fur-

From a paper presented before the American Foundrymen's association, Chicago, April 8-11.

nace and it will be understood that the return gas firing program applies only to the holding period, although the neutral atmosphere generated would tend to hold between 12 and 24 hours on the cooling period. On account of the favorable operating results obtained on No. 5 furnace, it was decided to equip No. 6 furnace with a somewhat improved return gas system. The principal changes were to eliminate the 4-inch construction in the return pipe and to provide means to either by-pass the exhaust fan or use it as a venturi exhaust or use it directly. The return gases were withdrawn below the exhaust fan. This latter adaptation of the flue system is shown in Fig. 1. This furnace has been operating with returned flue gas since January, 1929, with satisfactory results as to control and quality of product.

Discussion of Results Classified

A discussion of the result obtained from this method of firing annealing furnaces might readily fall into two classifications, namely, the principles of combustion involved and a consideration of the effect on the equilibrium of the iron-carbon-oxygen system as it relates to the stability of the surface layer of the ferrite-temper carbon composition.

Return gas was brought into the mixing chamber at 600 degrees Fahr. and then through the carburetor, producing a temperature of 400 degrees Fahr. immediately below the burner. While this degree of temperature carries an appreciable amount of heat into the burner gases, it is doubtful whether it directly represents a saving in fuel, as the carbon dioxide in the return gas absorbs more heat to bring it to flame temperature than the oxygen in excess air.

We are not yet able to report figures which would give accurate comparisons of coal ratios, but it would appear that the coal consumption in this method would be low, due to uniformity of temperature and the ease of control. Data as to pot life are not yet available, although visual examination indicates less formation of scale. In this connection, it may be said that the character of the furnace atmosphere has been determined by the eye, checking with numerous intermittent gas analyses, as carbon dioxide and carbon monoxide meters have not yet been installed. No attempt has been made to carry more than a fraction of a per cent of carbon monoxide.

The stability of the surface and the surface layer of the malleable cast iron during the annealing cycle has received the attention of a number of competent investigators in recent years. The formation of scale on the castings and a "picture-frame" fracture either ferritic or pearlitic, are effects of conditions, more often than not, incapable of interpretation by the practical foundryman.

Fracture Study Reveals Effect

Our study of fractures of iron from annealing cycles operating on return gas indicates that a marked effect has taken place, and it is reasonable to assume that it can be explained by a definite condition of equilibrium between the constituents of the iron and the furnace atmosphere if all data were available. It is hoped at some future time that it will be possible to report further progress in the study of this subject.

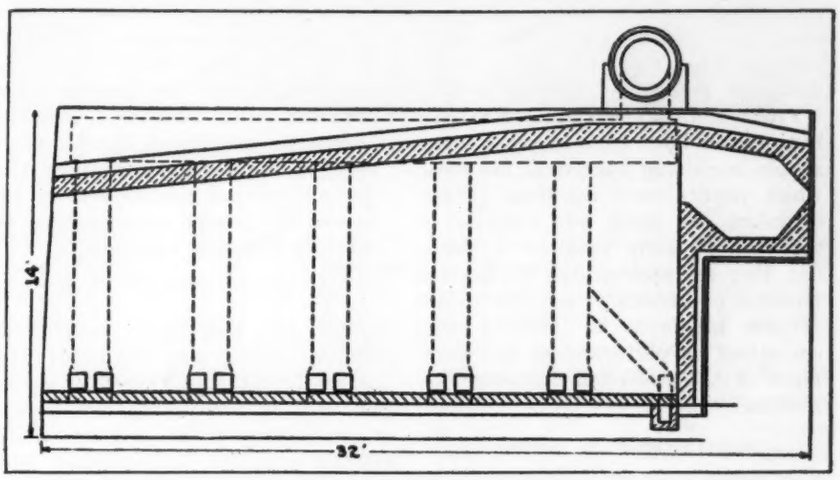


Fig. 2—Section of furnace showing flues and over-all dimensions

Preparing To Entertain American Foundrymen

Preparations for the international foundry congress to be held in London, June 11-15, now are entering upon an active period. One of the features of the pre-convention tour will be a visit to the North-East Coast exhibition at Newcastle-on-Tyne, which opens May 14. The display of engineering will be one of the best ever seen under one roof outside of London, the leading firms of the North-East coast all having taken space to display their manufactures. Visitors from all parts of Great Britain and foreign countries should be interested in the large number of working exhibits. As an industrial exhibition it promises to be one of the most successful ever held in England.

In addition to the foundries and works which will be visited during the pre-convention tour, visits will be paid during the convention week in London to the works of Dewrance & Co., manufacturers of boiler mountings, valves, anti-friction metals, and brass founders; Fraser & Chalmers, Erith, Kent, ironfounders and manufacturers of steam turbines, conveying and transporting plants, mining machinery, winding engines, dry gas cleaning plants and rolling mills equipment, pulverized fuel plant and heavy oil engines; and J. & E. Hall Ltd., Dartford, Kent, ironfounders, engineers, manufacturers of refrigerating machinery.

Continental foundrymen are hoping that the American delegates to the congress will continue their trip after the congress and visit the continent, where they can be assured of a cordial reception.

Radio in Auto Class

Through standardization of parts and stabilization of engineering principles, the production of radios in the United States has reached the same stage as automobile production, states the Union Trust Co., Cleveland, in its monthly magazine, Trade Winds. A significant trend is that while annual retail sales of receiving radio sets increased from $5,000,000 in 1922 to $306,000,000 in 1928, the sales of parts in the same period dropped from $40,000,000 to $12,000,000. This indicates that the novelty stage of radio has passed and the great majority of sets now are purchased, benefitting producers proportionately.

The Weaver Brothers Co., Adrian, Mich., specializing on pickling room equipment, is now operating in its new plant.

Special Machine Reduces Time of Finishing Boiler Sections

Radiator Company Designs Equipment for Surfacing Two Sides of Section Simultaneously, Thereby Expediting Production

IN ANY manufacturing operation, the production cost is governed by the number of man hours involved. If the man hours can be reduced, production automatically become more economical. Thus labor cost in every instance is a prime factor in production.

Production engineers study constantly to reduce labor costs by substituting simple machining operations for those which require excessive time. When engineers can finish two surfaces in the time formerly required to finish one, they are approaching the highest pinnacle of efficiency and the object of this article is to describe such operations as performed at the Bond plant of the American Radiator Co., Buffalo.

Manufactured in Sections

The American Radiator Co., manufactures cast iron hot-water and steam boilers for household and industrial heating. These boilers are made in sections; a number of sections being placed end to end to form a unit. The joints between the sections must be sealed to prevent the seepage of combustion gases. With the method of machinery previously employed it was impossible to generate accurate planes on the parts and consequently it was necessary to lute the joints with a cement mixture. Eventually the luting fell away which necessitated reapplication from time to time. To obviate this troublesome detail, the grinding process was introduced with the result that both sides of a section can be finished accurately and at one setting of the work. A substantial reduction in production time naturally resulted while the surfaces thus finished can be assembled together effectually without luting.

Reduces Machine Time

WHEN two surfaces are finished in the time generally required to machine one, production is expedited approximately 100 *per cent. The accompanying article illustrates and describes some interesting grinding operations performed at the Bond plant of the American Radiator Co., Buffalo, wherein two surfaces on one casting are ground at one setting on specially designed machines.*

The operation of finishing both sides at one setting of the work on boiler sections 44 inches long and 31 inches wide is illustrated in Fig. 1. This machine is a specially designed 2-wheel grinder, built by the American Radiator Co. The wheels are located on opposite sides of the work. The wheels are 64 inches in diameter and are of the segmental type embodying 20 blocks each, 14 grit in a medium grade. Power is furnished by a 100 horsepower motor which runs at 300 revolutions per minute. The wheel spindles are driven at 320 revolutions per minute.

Fixture Made Adjustable

Referring to Fig. 1, it is shown that the work is mounted in a special fixture which is located on a bed that travels between the wheels. This workholding fixture is adjustable to accommodate boiler sections of various diameters and widths and in finishing some of the smaller sections it is possible to locate two at one setting, one just behind another. With the fixture in the loading position, a section is brought to the grinder by an overhead crane and set in place. It is located accurately by stops and held firmly by screw clamps, two of which can be seen in the illustration. One pass of the work between the wheels completes the operation. From ⅛ to ¼-inch of material is removed, while the floor-to-floor grinding time on the sections in question is 1½ minutes. The

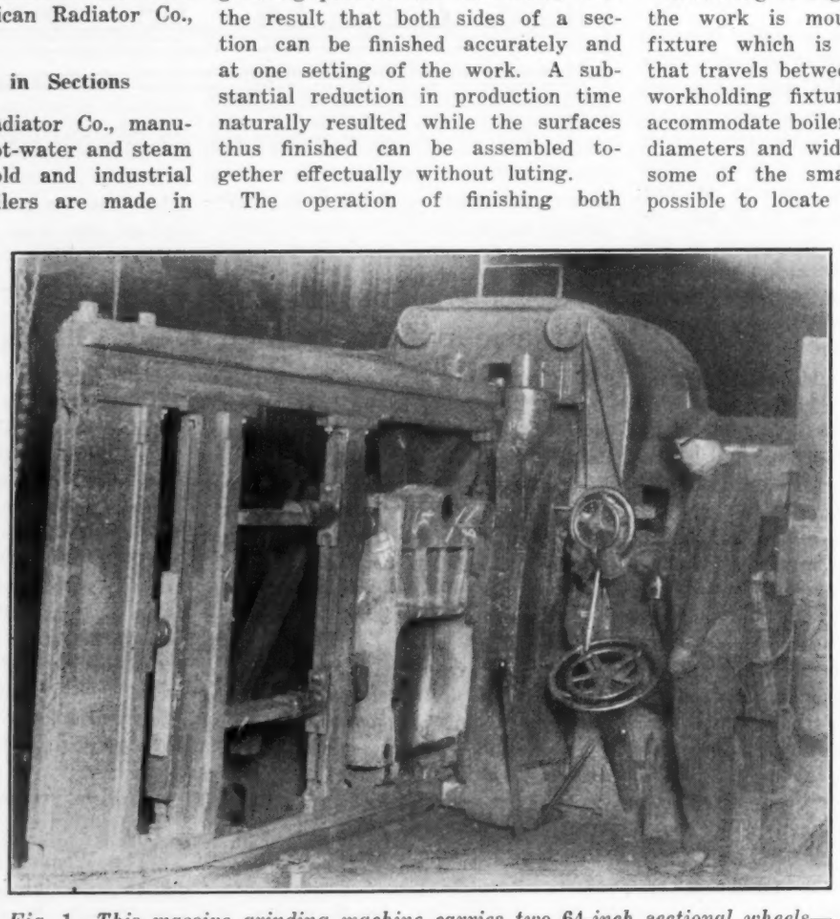


Fig. 1—*This massive grinding machine carries two* 64*-inch sectional wheels—the work is located in a special fixture*

work is ground dry. In comparing this time with that previously necessary to finish the parts, it is evident that the entire grinding operation including the setting up is performed in less time than was necessary to set up the work under the old.

Of course, the part in question is an ideal one for finishing by grinding as its design incorporates numerous depressions. A design of this kind expedites a grinding operation materially as it gives the wheel a chance to cut freely. From his operating station at the right in the illustration, the man in charge of the machine can observe the grinding operation at all times; and should it be necessary to reverse the work, owing to a faulty setting, this can be done instantly. The machine illustrated in Fig. 1 is the largest of its kind to be constructed and it reflects great credit on its designers to evolve a practical and simple grinding method.

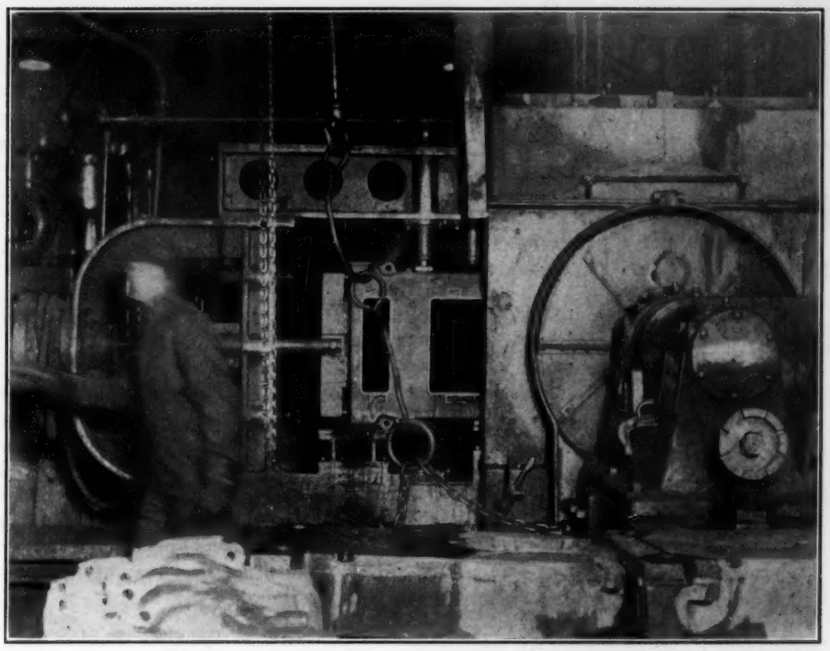


Fig. 2—Double-wheel grinder fitted with pneumatic clamping device to facilitate loading and unloading—grinding members are disks

Work Passes Between Wheels

Fig. 2 illustrates another type, a Gardner grinder used at the American Radiator Co.'s Bond plant. While this is a smaller machine than the one previously described, it operates on the same principle, that is the work is located in a fixture which sets on the bed that travels between two grinding members. These members are abrasive disks of a special texture. They are 53 inches in diameter and made in four sections with a 2-inch circle of 24 grit material at the rim, and the remainder 16 grit. These composite disks have been found to be productive of excellent results. The coarse material is free cutting while the finer abrasive is for the purpose of making the disk stand up at the periphery where most of the actual grinding takes place. The machine in question is fitted with pneumatic clamping devices for holding the work. This feature lowers the production time as it facilitates putting the work in place and removing it after it is ground. The section shown in place on the machine in Fig. 2 is 42 inches long and 22 inches wide, and the floor-to-floor grinding time is 1 minute.

Will Operate Permanent Lighting Institute

Depicting the application of electric light to all phases of life, commerce and industry, the Westinghouse Lighting institute will be opened in Grand Central Palace, New York, the latter part of May. This permanent institute for the advancement of modern lighting will be conducted under the auspices of the Westinghouse Lamp Co., East Pittsburgh, Pa. The opening in May will be coincident with the opening of the convention of the National Electric Light association in Atlantic City and the inauguration of light's golden jubilee.

The institute will constitute a large permanent experimental laboratory open to scientists, engineers, architects, designers and all others of every branch of industry seeking the solution of lighting problems. For example, the industrial engineer may present his plans for the erection of a manufacturing plant, receive advice and check his own lighting specifications, verifying his calculations by actual measurement and observation. The institute, which will occupy the entire seventh floor of the Palace, will be open to the public.

Chromium Plating Finds Wider Application

Chromium is coming into wider use in the metalworking industry, according to Dr. Donald C. Stockbarger, department of physics, Massachusetts Institute of Technology, Cambridge, Mass., who delivered a paper recently on this subject.

According to Dr. Stockbarger, the ore from which chromium is obtained is found in large quantities in many parts of the world, but because of cheap labor 70 per cent comes from Africa. The ore also is found in western United States, in India, and New Caledonia. The world's supply of the ore exceeds that of copper. In 1926 the world's production of chromium was 150,000 tons, about 45 per cent of which was used in alloys.

As a plating material chromium has almost as high a reflecting power as silver with the added advantage that it does not tarnish or change color. The chromium plating process is used extensively in the automobile industry and is being employed as a plating for yacht and ship fittings, plumbing fixtures, electrical apparatus, and innumerable small appliances.

Precision instruments such as gages, scales and meters are coated with it to prevent corrosion which would introduce inaccuracy. Rollers used in making plate glass are also chromium plated.

Electric Orders Gain

Orders received by the General Electric Co., Schenectady, N. Y., for the first quarter of 1929 amounted to $101,365,208, compared with $79,925,840 for the corresponding three months of last year, an increase of 27 per cent. Twenty-one directors of the company have been re-elected.

Enlarges at Ashtabula

Empire Steel Corp., Mansfield, O., is building a 35-foot addition to its plant at Ashtabula, O., to house two additional annealing furnaces with sufficient capacity to balance current production of full finished sheets.

Opportunities Are Increasing for American Foreign Trade

By James A. Farrell

THE expansion of our foreign commerce cannot fail to bring into existence questions likely to create misunderstandings in direct proportion as the premises upon which they rest remain shrouded in obscurity. In the midst of our activities insufficient attention has perhaps been paid to the great principle that the conditions that affect the welfare of any people, however, far from us, exert a corresponding influence upon our foreign trade, and consequently upon the daily work of American producers who help to supply the needs of consumers throughout the world.

We note evidence of increasing industrial and commercial activity in other countries, and sometimes we hear apprehensive comment of keener competition, but it is well to keep in mind that such increase of activity among other peoples means enlargement of their power to satisfy their own wants and desires, and that in such satisfaction will always lie opportunity for expanded sale of our own products. It is a noteworthy fact that the five or six industrial nations that are our keenest competitors are also the heaviest purchasers of our products, manufactured as well as crude.

Dependent on Other Nations

Our country is far from being self-sufficient and its internal prosperity is largely influenced by the material progress of other lands and by the goodwill of their nationals. Perhaps nowhere has this phase of the fundamental conditions of international exchange been more noticeable than in the field of oversea transportation.

Shipping was the last of our national industries to be demobilized after the war, and to a great extent it has not yet been accomplished. The government still retains ownership of a large fleet of all types, the greater part of which are laid up and doubtless will never be used for commercial purposes, because of the cost involved in making them ready for sea. Among such laid up vessels are two former German liners, and 400 odd cargo vessels aggregating more than 2,000,000 gross tons. The active fleet consists of some 233 cargo vessels of some 1,350,000 gross tons, engaged in overseas service, which compares with 180 cargo vessels of about 1,000,000 gross tons and 44 cargo and passenger vessels of about 535,000 gross tons, privately owned and engaged in overseas service, inclusive of the transatlantic steamers recently sold by the shipping board.

Still a Debated Subject

The various experiments, to which ownership and operation of trading vessels by the government have given rise, still are a fertile field for argumentative discussion. Nevertheless, the very presence of the instrumentality of government in the shipping industry has had a strong occult influence upon the destines of American shipping. The lack of consideration accorded to American vessels in regular commercial operations, may be ascribed to the impression created by the intervention of a public administration into transportation by sea, which is but a branch of the general machinery of foreign trade.

As a result, the prejudice aroused has reacted more or less upon all American shipping, and it may be pertinent to ask whether the time has not come to warn against boasting of the peaceful activities of our ships, on their uneventful journeys to the markets overseas, as a manifestation of collective mass action, since any vessel, whatever may be her flag, must give impartial service both to the countrymen of her owners and to the citizens of other nations who ship goods on her.

Regardless of the private opinions of some ship owners the laws compel them to render equal service to all of their clients and it cannot truly be said that American ships are serving American trade more when they leave an American port with cargo than when they sail from a foreign port with cargo of foreign origin for an American destination, for it may be found that in some of the cargoes leaving American ports no proprietary American interests ever existed, save in the matter of the benefit derived from the expenditures made by the ship.

According to the latest available statistics, the total volume of waterborne foreign trade in the fiscal year 1928 was 99,250,000 tons, of which American vessels carried 40 per cent of the total volume. Total exports by American vessels constituted 32½ per cent of the total volume, which figure, however, does not convey a true picture of the bulk of exports of American origin in American vessels, because important shipments of Canadian grain are made through United States ports, as well as shipments of transient tropical products in parcel lots, and of other cargo purchased locally by foreign interests and shipped in vessels specially chartered for the purpose. Of the total exports in American vessels, the percentage of 32½ was divided between the shipping board, with 10 per cent, and privately owned vessels with 22½ per cent.

Government Carries Less

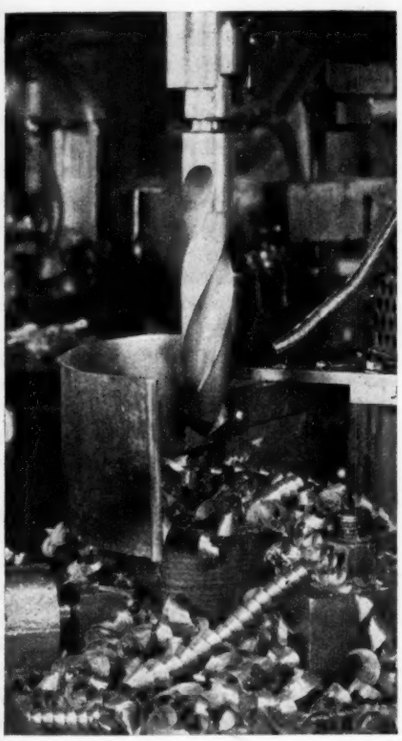
As regards the total volume of imports, 49 per cent was carried in American vessels, of which government vessels handled 5 per cent, and privately owned vessels 44 per cent. It may be asked whether the smaller percentage of imports than of exports carried by government vessels was caused by a deliberate avoidance of such tonnage by foreign shippers, which policy cannot be generally extended to privately owned American vessels, as instanced by the 44 per cent of the total imports carried by them.

The foregoing figures are inclusive of the important traffic on the Great Lakes. Take ocean borne trade alone, exclusive of the Great Lakes, total imports by American vessels were 46 per cent of the whole, of which government vessels had 6 per cent and privately owned American vessels 40 per cent. In exports of the same class, American vessels had 22 per cent of the total of which the government vessels had 12 per cent and privately owned vessels 10 per cent.

These figures show the extent to which the ocean borne trade of this country is still under government con-

Abstract of address delivered by the president of the United States Steel Corp. at the sixteenth National Foreign Trade convention, Baltimore, April 17-19.

trol, although the percentage has been somewhat reduced as against the government portion, by the recent activity of the shipping board in disposing of several government services to private owners with the fleets used on those routes. That such material results were obtained by privately owner American ships under the conditions which have confronted their owners in recent years is the best answer that can be given to any question that may arise as to the permanency of the services built up by private American enterprise under the most adverse circumstances. No other American industry ever faced such a situation. The fact that 1,500,000 tons of privately owned shipping engaged in foreign trade, built largely before the war at prices ranging from $80 to $120 per deadweight ton, has survived and is still operating in competition with the fleet of the world, speaks well for the perseverance of private management. Only the unbounded faith of private American



Danger is minimized by this guard and chip breaker

shipowners in the soundness of their position, through the experience of years, and the efficiency of the men and material employed by them, has enabled them to survive artificial handicaps far greater than the economic burdens upon the operation of the ships themselves.

The maritime nations of the world have built some 1550 ocean going vessels in eight years, aggregating 9,800,000 gross tons. At the same time about 40 vessels, aggregating 400,000 tons, have been built in American yards in that period. The average age of American cargo ships is in excess of ten years. In another ten years at the present rate of building, considering that the useful life of a ship is 20 years, some Macaulay will then be predicting that an American will be standing on the bridge of a lonesome ship, scanning the horizon in vain for a craft bearing the flag of his country.

Chip Breaker and Guard Eliminate Danger

CONSIDERABLE hazard was caused by flying chips in one of the departments of the River Works, of the General Electric Co., West Lynn, Mass. These chips came from a metal drill used in the special cutting of steel and were a continual source of danger not only to the workman tending the machine but also to passersby. In addition, fallen chips on the floor proved dangerous as well as unsightly. To overcome this situation, a novel device consisting of a breaker and guard was installed for controlling these chips. As shown in the accompanying illustration, the guard prevents chips from scattering while the chip breaker keeps them in one position on the table.

Blowpipe Does Otherwise Difficult Operation

WHEN construction began recently on a 53-story office building in New York, it was necessary to remove a fire escape projecting from the wall of an adjacent 20-story hotel, as the walls of the new structure were to be in contact with those of the older building. Before development of the acetylene process this would have been a tedious and long drawn-out task necessitating weeks of hard work, but by use of the cutting blowpipe, the operation was a matter of only a few days. The accompanying illustration shows two workmen engaged in the work. The manual labor was confined to guiding the oxyacetylene flame along the path of the cut. Railing, frames and supporting members were severed quickly. Where steel supports were anchored into the mortar and brick of the building, the cut was clean and close and accomplished with ease. This is but one example of how the cutting blowpipe, because of the speed and economy with which it accomplishes otherwise difficult tasks, has proven itself indispensable for structural or demolition work.

Fluorspar Output Is Up as Imports Fall

FLUORSPAR industry in 1928 was featured by substantially increased domestic shipments, the smallest imports since 1923, resumption of

Using an oxyacetyline torch to dismantle a fire escape

fluorspar mining in Nevada, greatly increased domestic output of acid-grade fluorspar, and the increase of 50 per cent in the duty on imported spar, states the federal bureau of mines, Washington.

Shipments from mines in the United States in 1928 included 65,884 short tons valued at $1,154,983 from Illinois, 69,747 tons valued at $1,426,766 from Kentucky, and about 5000 tons valued at $76,800 from Colorado, New Mexico and Nevada.

These shipments, by kinds, in 1928 included 122,202 tons of gravel valued at $2,129,329, 6146 tons of lump valued at $160,803, and 12,283 tons of ground valued at $368,147. Of these shipments, the steel industry in 1928 took 108,205 tons valued at $1,643,185 and the foundry industry 3694 tons valued at $66,215.

Imports in 1928 totaled 47,083 short tons. The bureau's detail of consumption in 1928 and stocks at consumers' plants as of Dec. 31, in short tons, is as follows:

	1928	
Industry	Consumption	Stocks at consumers' plants Dec. 31
Basic open-hearth steel	152,000	76,000
Electric-furnace steel	6,100	1,300
Foundry	3,300	1,000
Ferroalloys	800	400
Hydrofluoric acid and derivatives	20,500	11,000
Enamel and vitrolite	5,700	900
Glass	6,200	1,200
Miscellaneous	1,600	600
	196,200	92,400

Modern Equipment Cuts Foundry Grinding Costs 66 Per Cent

Investigation Discloses Many Avenues Through Which Efficient Steel Casting Finishing Can Be Obtained

By J. A. Lorenz Jr.

Works Manager, Indiana Harbor Works, American Steel Foundries

GRINDING methods in all foundries constantly are undergoing changes as the builders of grinding equipment are redesigning their machines to provide more power, rigidity, bearing and other characteristics which have helped to lower the cost of grinding. In a large measure reductions also have been effected through the progress made by manufacturers of both vitrified and vegetable bonded grinding wheels. It has been a combination of the foundries demanding more efficient operation and lower grinding costs, particularly for alloy steel castings, which has resulted in better design of machines, greater production and improved types of grinding wheels.

In a number of steel foundries, the subject of grinding has been given attention from a really scientific engineering viewpoint. Engineers and foundrymen were quick to realize rough steel casting grinding was just as much of a machine operation in the foundry as any other machine operation. Careful study has shown the results to be obtained were largely dependent upon the service to the machine as well as the combined operating characteristics of the machine and the grinding wheel. In other words, to procure efficient operation it was necessary to keep grinding wheels in contact with the work the greatest possible time during working hours. Therefore, the study of service to the machine and to the operator became an important phase of the grinding problem. It was found that good floors for the operator, correctly designed trays, racks, buggies, etc., for bringing the work to and taking from the machines, were necessary.

Without changing the characteristics of the machines or the grinding wheel, it has been found that by just giving the grinder efficient service and bringing the work to him in a properly designed container, giving him continuous work and service enabling him to dispose of the ground castings, the efficiency of the unit has been increased as much as 30 per cent. Of course, it must be realized that this can be possible only in cases where it is practically up to the operator to provide his own source of supply for grinding castings and disposing of them.

MANY steel foundries have studied the subject of grinding from a really scientific and engineering viewpoint, realizing that rough casting grinding is just as much a machine operation as any other machine operation. One foundry made an extensive investigation of its equipment and, finding its 11 *swing-frame grinders to be of obsolete type, replaced them with two modern high-speed grinding machines. The net result was a* 66 2/3 *per cent reduction in grinding costs with one man producing the work formerly done by five or six operators. How this economy was effected is told in the accompanying article prepared from a paper presented before the American Foundrymen's association, Chicago, April* 8-11. *The author, F. A. Lorenz Jr., is works manager, American Steel Foundries, Indiana Harbor, Ind.*

In approaching the subject of grinding castings, too often the only factor in the situation given consideration has been the grinding wheel itself, when the subject of a comparative service test of various makes and grades of grinding wheels is under discussion. The grain and grade of the wheel often is varied up and down. Grinding wheel manufacturers' experts have been in on the job and they have tried this grain and that grade of wheel. They may have suggested a change of equipment to the foundryman, but too often a deaf ear is turned to these suggestions and the foundries insist on going along with antiquated machinery, inadequate peripheral speeds and wheel changes or speed changes to provide the most efficient cutting speeds. By rearrangement of their department, giving service to modern up-to-date grinding wheel equipment reductions in costs can be made which are truly remarkable and will more than substantiate the cost of the changes.

The problem should be approached in its entirety. First, the question of layout should be considered.

Is the movement of the work to and from the machines as direct as possible?

Are the types of containers or the layout of the work for the grinders efficient?

Is the grinding unit flexible enough to take care of the class of work to be handled?

Is the operator able to do continuous grinding or is he constantly interrupted?

Are the grinding machines themselves efficient?

Are they under-powered?

Is there proper lighting, heating and ventilation in the cleaning room?

All of these subjects have their influence on the problem. After all of these factors have been considered and a layout determined, which will give the best service possible to the operator of the grinding machines, then the question of the proper type, grain and grade of wheel may properly be considered. When all of these factors are taken in combination and the grinding department properly laid out, or in most cases with the present grinding equipment in the foundries completely revamped, the results which will be obtained truly are astounding.

In a cleaning department where large castings are chipped and ground, the grinding equipment formerly consisted of 11 swing frame grinders

belt-driven from a lineshaft. These grinders were the type which were hung from a side-wall bracket, hinged at the top and in the center, which gave them a limited radius of operation of approximately 2 feet front and back, and 3 feet to either side, and such upward and downward motions as the operator was able to control by his own strength. This type of swing frame grinder was in vogue in foundries 20 years ago, and is still continued in many foundries today.

In previous tests it had been the custom to take different makes and grades of grinding wheels and compare them one against the other, for pounds of metal removed per contact hour, running them at speeds which the wheel manufacturers and the foundrymen knew were inefficient, but due to physical limitations of the machines, wheel changes were not made at the point to insure efficient grinding. No thought was given to the machine, no thought was given to the time consumed bringing the work to the grinders and then removing it, or the delays occasioned to adjacent grinder operators when work was being placed by overhead crane. The efficiency of the machine, power losses and high maintenance expense due to poor design were lost sight of in the test. The limited radius of action caused many unnecessary movements of work and constant delays to the operators, so the actual contact time of the grinding wheels with the work on an average day showed an efficiency of less than 50 per cent, and in many cases, due to the character of the work, as low as 30 per cent.

New Grinders Installed

The problem of grinding in the particular department was then considered in its entirety and it was decided the 11 swing frame grinders could be dispensed with and replaced with two up-to-date high-speed grinding machines, which could be hung on a side wall crane, manipulated from the floor and traversing a space 40 by 20 feet. The whole machine was hung so that it had a radius of operation of 360 degrees and an up and down movement of 8 feet. The floor space was all clear. The results of installing the new machine and the handling equipment exceeded the expectations, as one operator is now doing the work with ease which was formerly done with five and sometimes six operators and machines. His work is laid out in such a manner that the only time lost is the time consumed in raising and lowering the grinding machine by a hand-operated chain block or moving from one piece of work to the other by means of the electrically-operated side wall crane.

Work is brought to the grinding wheel and laid out in such a manner that it is most convenient for the operator to grind, with the net result that the grinding cost, taking into consideration cost of wheels, overhead, supervision, power, repairs, service, etc., has been reduced to one-third of the former cost. To show the comparative cost of grinding by the old and new methods, the following specific details are given:

	—Best Performance— Old practice	New practice
Average pounds of steel removed per hour	8.8	40.4
Abrasive cost per pound of steel removed	$0.063	$0.059
Labor and overhead per pound of steel removed	$0.106	$0.022
Total cost per pound of steel removed	$0.169	$0.081*

*This is now reduced in actual average practice to $0.070.

Here is a case where the foundry has gone to considerable expense providing new machines, costlier wheels and an extensive crane layout, yet the net results have been to reduce their grinding cost 66 2/3 per cent.

The improvement which has been made in grinding machinery designed for foundries as well as the remarkable strides made in the development of grinding wheels for use on various types and analysis of castings, offers one of the biggest fields for investigation by the foundrymen and others, as the application of the improved methods, machinery and grinding wheels will surely result in one thing —a reduction in cost of cleaning castings when intelligently applied to a particular problem. Experience has demonstrated this to be true.

In the foregoing tabulation are indicated the best results obtained on the old grinding practice, and composite figure of the results obtained from trials of five makes of grinding machines which were substituted for the old machines. It is important to know the practice was changed from grinding with vitrified wheels, having a maximum speed of 6000 surface feet per minute, to vegetable bonded wheels having a maximum speed of 9000 surface feet per minute. Wheel changes were made at the points indicated in the accompanying illustration.

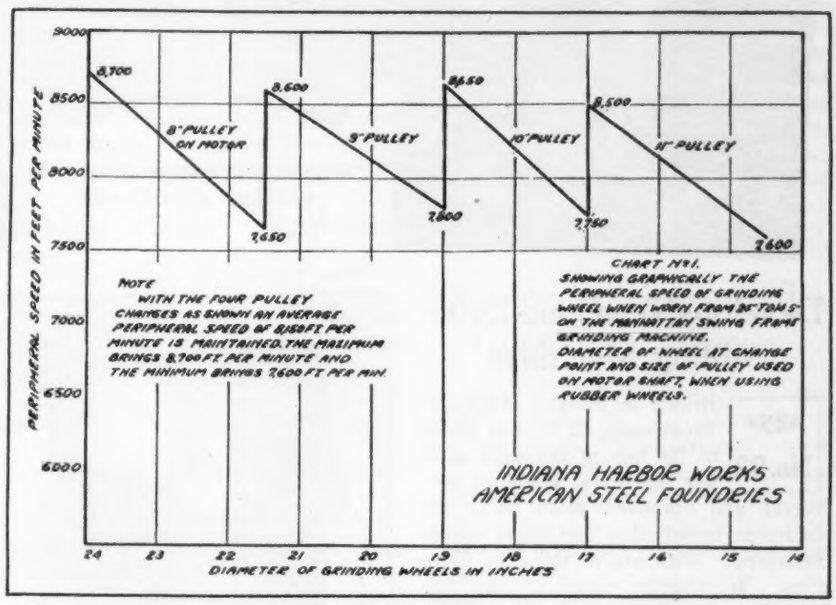
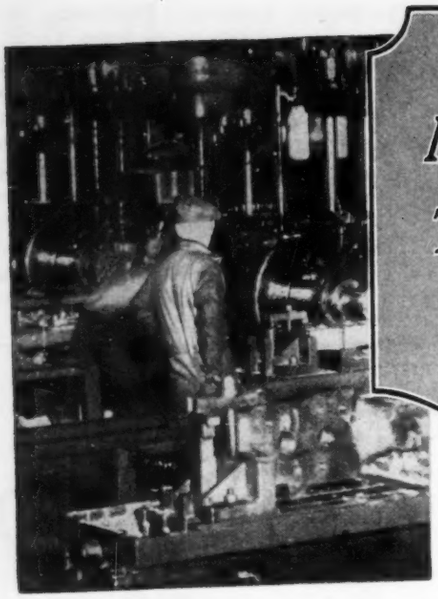

PERIPHERAL SPEED IN FEET PER MINUTE
9000
8500
8000
7500
7000
6500
6000
8,700
8,600
8,650
8,500
7,650
7,800
7,750
7,600
8" PULLEY ON MOTOR
9" PULLEY
10" PULLEY
11" PULLEY
NOTE
WITH THE FOUR PULLEY CHANGES AS SHOWN AN AVERAGE PERIPHERAL SPEED OF 8150 FT. PER MINUTE IS MAINTAINED. THE MAXIMUM BRINGS 8,700 FT. PER MINUTE AND THE MINIMUM BRINGS 7600 FT. PER MIN.
CHART NO 1.
SHOWING GRAPHICALLY THE PERIPHERAL SPEED OF GRINDING WHEEL WHEN WORN FROM 24" TO 14½" ON THE MANHATTAN SWING FRAME GRINDING MACHINE.
DIAMETER OF WHEEL AT CHANGE POINT AND SIZE OF PULLEY USED ON MOTOR SHAFT, WHEN USING RUBBER WHEELS.
INDIANA HARBOR WORKS
AMERICAN STEEL FOUNDRIES
24 23 22 21 20 19 18 17 16 15 14
DIAMETER OF GRINDING WHEELS IN INCHES

Chart showing peripheral speed of grinding wheel when worn from 24 to 14½ inches diameter on swing-frame grinding machine; diameter of wheel at change point and size of pulley used on motor shaft when using rubber wheels

Costs Reduced Two-thirds

In considering the above table, no allowances have been made for the loss of time occasioned by the former practice where five grinders were working close together and were often delayed by placing and removing castings. It will be seen from the figures the average pounds of metal removed per hour are approximately in the ratio of 5 to 1. In other words, one operator now replaces five operators, so that the delays due to placing and removing of work have been reduced to practically a minimum. Under the new method actual total cost of pounds of metal removed is approximately one-half the best practice formerly obtained. Comparing the average cost as shown on the cost sheets, the present grinding costs in the department where tests were made is approximately one-third the former cost.



New Machine Tools and Shop Equipment

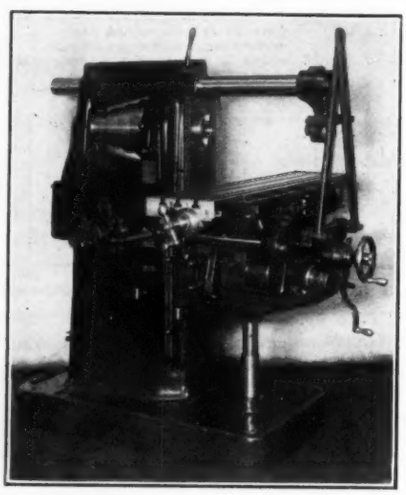
"Without tools man is nothing, with tools he is all."—Carlyle

DevelopsNewCone-Drive Milling Machines

No. 92

Brown & Sharpe Mfg. Co., Providence, R. I., has added to its line of standard milling machines, standard universal and standard plain units for toolroom installation and light manufacturing. Both are of the cone drive type. In addition, they include features of the standard machine. The plain type is shown in the accompanying illustration.

Power is furnished through cone pulleys mounted on sleeves on the machine spindles. A fast and a slow series of spindle speeds are available with the slow series obtained through back gears easily engaged by a lever on the left-hand side of the machine.



No. 92—Standard plain milling unit

Two operating positions are provided, one at the front and one at the rear of the table, with all levers controlling the operation of the machine readily available from either position. All changes in the power feed of the table are made by rotating either of the feed change levers which are located conveniently at the front of and rear of the table operating positions. One revolution of either lever, to the right or left, accomplishes a change of feed. The rate of feed engaged is shown on both of the direct reading dials which are set at an angle to facilitate quick reading and are provided with glass windows to prevent clogging by chips and dirt.

Filtered oil is automatically supplied to all bearings within the column by a plunger pump, thus assuring positive lubrication. A gage on the side of the column indicates the

Iron Trade Review's Calendar of New Equipment

Item	Comment	Builder	No.	Date Described	Page
Grinder	Portable pneumatic type with multivane motor	Ingersoll-Rand Co.	68	March 28	858
Electrode holder	For metallic arc welding; copper jaws prevent sticking	Lincoln Electric Co.	69	March 28	859
Die head	Floats on shank, permitting self-centering on stock	Landis Machine Co.	70	March 28	859
Grinder	Air-operated, light in weight; close speed control	Buckeye Portable Tool Co.	71	March 28	859
Grinder	Pneumatic; for grinding metals of high tensile strength	Rotor Air Tool Co.	72	March 28	859
Grinding wheel	Four abrasive segments mounted in 11-inch wheel	Blanchard Machine Co.	73	April 4	928
Die punching press	Built with six punches and dies, individually operated	Zeh & Hahnemann Co.	74	April 4	928
Wire reel	For use with cable or wire rope stranding machines	Pittsburgh Producers Supply Co.	75	April 4	928
Switches	New line of master and limit switches, cam operated	General Electric Co.	76	April 4	928
Pipe machine	Duplex 12-inch type; designed for oil field work	Bignall & Keeler Machine Works	77	April 4	929
Gear shaver	For finishing teeth of rough cut gears to true involutes	Pratt & Whitney Co.	78	April 11	1000
Double-pawl clutch	Incorporated in design of new line of presses	American Can Co.	79	April 11	1000
Air drill	Rotor governor controls speed and air consumption	Rotor Air Tool Co.	80	April 11	1001
Polishing machine	Also buffing; double spindles entirely independent	Excelsior Tool & Machine Co.	81	April 11	1001
Buckets	Open and closed types for materials handling	Reichmann-Becker Polyp Co.	82	April 11	1001
Coal loader	Electric operation; continuous loading action	Covington Machine Co.	83	April 11	1001
Pump	Hydraulic; working pressures up to 6500 pounds	John Robertson Co.	84	April 11	1001
Truck	For carting loose materials about shop	Pittsburgh Producers Supply Co.	85	April 18	1067
Gear generator	Generates large pitch helical, spur and herringbone gears	Farrel-Birmingham Co. Inc.	86	April 18	1067
Polishing machine	Grinds, polishes and buffs; four grinding wheels	Excelsior Tool & Machine Co.	87	April 18	1068
Punches and retainers	Complete line and interchangeable; high safety factor	King Works	88	April 18	1068
Strip heater	Electric; 24 inches long; for 110 or 220 volts supply	General Electric Co.	89	April 18	1068
Pouring device	Trolley runs on I-beam; ladle operated electrically	Modern Pouring Device Co.	90	April 18	1068
Lever punch	Capacity of 5/16-inch hole in 5/16-inch iron	Excelsior Tool & Machine Co.	91	April 18	1069
Milling machines	Standard universal and standard plain units	Brown & Sharpe Mfg. Co.	92	April 25	1132
Tool holder	Floating type; friction is minimized	Apex Machine Co.	93	April 25	1133
Abrasive tools	Carborundum reamers and files	Carborundum Co.	94	April 25	1133
Milling head	Combination side and end type	Giddings & Lewis Machine Tool Co.	95	April 25	1133
Switch	Direct-current cam switch for controlling auxiliaries	General Electric Co.	96	April 25	1133

pressure. Another pump automatically lubricates the knee mechanism while a large well at the front of the saddle oils the complete saddle mechanism and the table bearings. The one piece knee elevating screw assures accuracy in vertical adjustments. It is completely enclosed in a steel sleeve and does not extend below the base of the machine. The overarm is firmly clamped at two points by a single lever at the front of the column.

Floating Tool Holder Is Placed On Market

No. 93

Apex Machine Co., Dayton, O., has placed on the market a floating holder which permits the tool to enter the work on a straight line when the machine spindle and the work do not line up but have parallel axes.

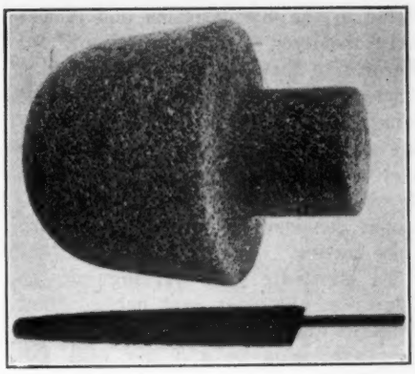
The float in this holder is all ball bearing, the friction being minimized. This tool has 3/16-inch float, 3/32-inch each side of center. It is furnished with either straight or taper shank and with bottom to take straight shank tools, taper shank tools, or with the quick change drill chuck.

Carborundum File and Reamer Introduced

No. 94

Carborundum Co., Niagara Falls, N. Y., has introduced an abrasive file, composed of carborundum bonded with redmanol, which has wide application in the foundry field for removing and smoothing up the seam marks on sand cores upon being taken from the molds. These files, which are of the half-round tapered shape with a steel rod running lengthwise through them, are used chiefly on jacket cores and the end of the steel rod protruding from the butt end is used for punching holes in the cores. These files are made in three standard overall lengths of 8½, 10½ and 12 inches.

Another abrasive tool of interest to the steel and other metal producing industries is a carborundum ladle nozzle reamer, one shape of which is shown along with the abrasive file. This reamer is used for grinding or reaming out clay nozzles, an essential operation to get a close fit between the nozzle and the stopper head. The reamer is used with a brace by which it is rotated in the clay nozzle until the desired smoothness and a snug fit is obtained. Abrasive reamers are made of coarse grit carborundum by the vitrified process. They can be



No. 94—Abrasive reamer and file

obtained in practically any desired size or shape, the size of the stopper head being the governing factor.

Milling Head Combines Side and End Types

No. 95

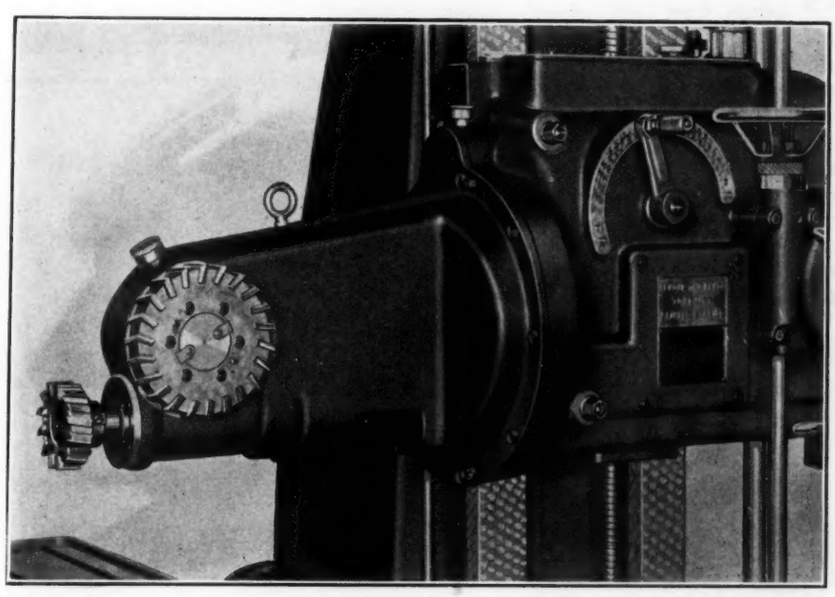
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has placed on the market a combination side and end milling head. This unit is rigidly built with a cone shaped body. Power for driving the cutters is received from the spindle. A spur gear with taper arbor is placed in the spindle which is extended until the gear meshes with the gear on the end of the worm shaft to which the small milling cutter is attached. The large cutter is driven from the small cutter shaft through a hardened and ground alloy steel worm and bronze worm wheel. The speed of the large cutter is always one-fourth the speed of the small cutter, which is the same as the spindle speed of the machine.

Bearings in the attachment are heavy type combination radial and thrust type and are packed in grease, completely inclosed to protect them against dust and grit. A draw bolt, accessible through the hand hole, is used for drawing the small milling cutter arbor into the socket. The milling head is bolted and dowelled directly to the machine in place of the back gear cover plate. An eyebolt is provided to facilitate handling by a hoist. This head can be furnished in two sizes with single or double side mills. A similar attachment with the large milling cutter arranged for vertical milling, also is available. Specifications for the 10-inch size include a large cutter of 10-inch diameter, small cutter of 5-inch diameter and reach of 27 inches; for the 12-inch size, a large cutter of 12-inch diameter, small cutter 6-inch diameter and 32-inch reach.

Cam Switch Designed To Control Auxiliaries

No. 96

General Electric Co., Schenctady, N. Y., announces a new direct-current cam switch, developed to control auxiliaries as pumps, blowers, etc. The switch can also be used for nonreversing applications where the current inrush or starting torque is not severe or the operations frequent. The new switch is available in two forms. Both are for nonreversing service with armature regulation over five points, while one form has field regulation over 22 points. The intermittent armature current capacity is 1000 amperes, while the same capacity, continuous rating, is 500 amperes. The switches are rated 550 volts, maximum.



No. 95—Combination side and end milling head, showing large and small cutters

Suggests Specifications for Foundry Coke

Revision of specifications for foundry coke was considered at length recently by subcommittee VIII on foundry coke specifications of committee D-5 of the American Society for Testing Materials. Finding it difficult to revise the specifications so they will include all possible grades of coke that might be used in the foundries under certain economic conditions without seriously disturbing present commercial terms or without making the specifications so detailed as to be burdensome, the committee finally agreed that the new specification should be based on a contract statement as to the several properties of the coke to be specified, and that the specification should contain only the tolerance which would apply to these properties mentioned in the contract.

Tolerances proposed are as follows:

Ash: 5 per cent of the specified ash content, plus 0.25 per cent ash.
Sulphur: 10 per cent of the specified sulphur content, plus 0.05 per cent sulphur.
Volatile matter: 10 per cent of the specified volatile content, plus 0.10 per cent volatile.
Shatter test: Tolerance of 5 per cent flat.
Moisture: This would be limited to 3 per cent maximum in all cases, the samples being taken as loaded.

Porosity and fineness was considered, but porosity was not believed by the committee to be of any special value in the specifications and it was not considered feasible to sample for fineness in the "as received" condition. The combustion test was discussed at length and the committee is endeavoring to secure sufficient data on this test to justify including it in the specification as it seems to hold promise of considerable import in foundry coke testing.

To illustrate the working of the tolerance, a 10 per cent ash contract would allow a variation of 0.75 per cent ash, whereas a 7 per cent ash contract would allow only 0.60 per cent variation. A 1.0 per cent sulphur contract would allow 0.15 per cent sulphur variation, whereas 0.50 per cent sulphur contract would permit only a 0.10 per cent variation.

Comments and criticisms on the proposed specifications should be addressed to J. T. MacKenzie, chairman of subcommittee VIII on foundry coke specifications, American Cast Iron Pipe Co., 4300 Glenwood avenue, Birmingham, Ala.

Makes Insulation from Charcoal Slag

Conversion of iron ore slag into a high grade insulation material is claimed possible by C. O. Bachman, chemical engineer for the Delta Chemical & Iron Co., Escanaba, Mich. Two years of research work have been devoted to the process, which has been patented by the Delta company.

Laboratory tests are said to reveal nearly complete resistance to heat and cold and no signs of fusion under 2500 degrees Fahr. The material, designated as crystal wool, is used for packing steampipes, boilers and tanks, for insulating buildings, and for wallboard. The Delta company is equipped to make 4000 tons annually. A description of the process, applicable, it is claimed, only to charcoal iron slag, follows:

In the manufacture of pig iron, 50 per cent of the ore put into the furnace is impurities. Through a process of reduction and oxidization, impurities of the slag are removed from the furnace and the product left is pure silica.

The pure silica is then taken from the furnace at a temperature of about 3000 degrees Fahr. and the molten mass passed over a series of high pressure, super-heated steam jets; the molten mass changes from a ribbon-like formation to that of small pellets, 1/64-inch in diameter.

The molten silica as it passes over the jets attains a velocity of about 500 miles an hour. In traveling over a secondary series of jets, it comes in contact with high pressure carbureted oil gas, where the temperature of the small pellets again is raised. From this point on, the pellets are in a molten state as they are conveyed through a short steel tunnel into a receiving chamber, which is a fireproof room, 20 x 30 x 20 feet. In going into this chamber, the pellet takes on a comet effect, because of the high speed at which it is traveling, leaving behind it a thin silky fibre about 1/1000-inch in diameter. In its flight, the pellet entirely dissipates itself and the silky fibre falls to the floor, assuming the appearance of a pile of silk fluff or cottondown.

Tractors Drag Steel Pipe Up Heavy Grades in California Hills

A GLIMPSE of the California hills today does not reveal horses and oxen pulling timbers and doing all the heavy work. Pipe line constructors, employing modern, economical methods of haulage are less liable to think of. "Over the hills to the poorhouse" as they see miles of line, like this, stretch upward and away in the distance. Here we have a tractor dragging steel pipe, each weighing 1½ tons, up a steep grade on the Pacific Gas & Electric Co.'s job between Kern county, San Francisco and bay cities. Caterpillars are being used to move all the heavy equipment.

Tungsten Carbide Tools Influence Design

(*Concluded from Page* 1117)

ports, so common in this country. The tools should be firmly clamped to a solid support whenever possible.

Fig. 7 shows the proper location of the tool with respect to the center line of the work.

In conclusion, Mr. Guild declares that widia is not a cure-all. This, of course, is equally true of other tungsten carbide materials. There are some cases of high speed finishing on soft steel where the advantage gained would not warrant the additional expense. Those who take a widia tool and put it in a machine without studying the conditions, which may be suitable for high-speed steel tools, but wrong for widia tools, and expect to secure amazing results, are doomed to disappointment. On the other hand, if widia or other tungsten carbide tools are placed in service under proper conditions, the result will be all that could be desired.

Editorials

Volume "Complex" Aids Consumers

ONLY superlatives can measure the performance of the iron and steel industry in regard to production in recent months, but prices have been singularly stable, to the evident benefit of consumers.

Under certain conditions, prices might be expected to soften in the face of unprecedented output. Likewise, the demand that sometimes prompts peak output might result in a runaway price market. But in iron and steel, demand and capacity seem closely attuned.

Barring, say, a rise of $1 per ton in heavy finished steel, a $2 advance in some grades of sheets, a realignment of prices on strip due to more equitable extras, and a current movement to put up semifinished steel, prices have moved narrowly this year.

Present prices appear extraordinarily low compared with the levels which obtained at the high point of the war period—the summer of 1917—when production was 30 per cent lower than today. Open-hearth billets at Pittsburgh then were $100 a ton, wire rods $96, sheet bars $105, plates 9.45c, bars 4.75c and tin plate $10 per base box. Basic iron in the valleys was up to $52.85, malleable at Chicago to $59.50, and No. 2 southern at Birmingham to $48. Heavy melting steel at Chicago went to $37. These prices are the peak monthly averages.

Steel consumers have profited not only by the great advances and economies effected in steelworks methods since the war but also from the desire of the mills to solidify a stable market and cash in on volume.

Filling Markets Near Home

IN EFFECT the American iron and steel industry seems to have established what might be called a parallel to the Monroe doctrine, as applied to iron and steel products supplied to consuming countries in the western hemisphere.

Statistics of exports of iron and steel for 1928, just completed and announced by the department of commerce, reveal the preponderance of exports from the United States to Canada, Central America and South America. About 60 per cent of exports of iron and steel from the United States during that year went to other countries in the Americas.

Undoubtedly European producers also sold tonnages into these countries, but the total from the United States is so heavy it indicates a large occupancy of the opportunity offered by these markets. No reason appears to exist to prevent increase in this respect and European producers may find increasing difficulty in competing, in spite of the former theory that merchandising by the United States could not compete with that developed by European sellers.

Tonnages sold in the Orient, principally to Japan and China, indicate the American exporter is learning to compete successfully in that market and to enlarge the opportunity across the Pacific.

Wartime Scrap No Factor Now

OCCASIONAL pieces of equipment used in wartime manufacture of ammunition or special products for that period still make their appearance in steel scrap offerings before the markets. In the yards of many plants may be seen similar reminders of the accumulations of scrap from the war years. Casual observation sometimes leads to the view that the last of the scrap of the war years even yet has not been cleared away.

Happily for the scrap collector and yard dealer, the shell dumps, armor plate, axles, tractor and ordnance parts accumulated from the pressure of wartime production long since have vanished in the melting furnaces. In the West, the heaviest of these accumulations, except for the surplus shipping board vessels scrapped by the Ford interests, have been gone for five or six years.

During the war the countryside was combed, and farms, the villages and backwoods sawmills gave up scrap that was years in the gathering. Many years probably will pass before all of this material shall have been handled as such for the last time. The economic possibilities of the wartime scrap as a factor in the markets, however, virtually have disappeared.

Unsteady Metal Prices Ahead

NONFERROUS metal prices have been shaken down with a severity almost unequalled in a period of good business. If he had watched only copper and lead prices in recent weeks one would think the country was going through a period of bankruptcies and panic. Yet there are logical and economic explanations

for this seeming paradox, and the drop was less of a shock than its precipitateness.

Since autumn, every user, domestic and foreign, has been a heavy buyer of copper. The usual staggering of demand by various users was absent. Expanding demand sent prices up, which in turn prompted further buying. Two major mining accidents in South America and the Mexican rebellion threatened supplies. The stock market favored strong commodity markets.

Prices finally reached the point of resistance, with talk of substitutes. In the resulting quiet period came the break in the stock market. The situation in Mexico grew more favorable, reparations in Europe became uncertain, and there was some speculative resale of copper. Customs smelters, who found it difficult to sell in a swiftly rising market, naturally became anxious sellers when it became uncertain whether they could again get as high as 24 cents a pound. March statistics for the industry were disappointing.

The swing, at first imperceptible, from a sellers' to a buyers' market, developed into a crash, but the market began to show resistance at a level well above that of recent years because most producers are unusually well sold and consumption remains above the average.

In other metals the story is identical on a lower plane. The break in tin came with prices at a relatively cheap level, as output has long exceeded use. The result of these gyrations is likely to fluctuating prices in all metals for some time.

Work Toward Economical Grouping

REDUCED operating costs for major merchant blast furnaces in the Pittsburgh-Youngstown valley district and a more stable pig iron market are benefits that appear likely to accrue from negotiations that give the Davison Coke & Iron Co., Pittsburgh, control or a close working arrangement with all but one merchant stack in that area.

Construction of sufficient by-product coke oven capacity is under way at Pittsburgh to supply several of these furnaces with fuel at low cost, a move that marks another downward step in the dwindling demand for Connellsville beehive coke. The efficiency that is obtainable through regulation in operation of the various stacks in accordance with demand should be reflected in reduced costs, while employment of river transportation also may effect economies.

This grouping of merchant furnaces necessarily does not indicate higher pig iron prices; steelworks interests will continue an important factor in the sale of pig iron, but considerable of the uneconomic competition that has prevailed for a number of years to the accompaniment of poor profits will have been removed. Competition between merchant and steelworks furnaces in the past has been no less noticeable than that between the various individuals of the former group. Generally this has resulted in an unprofitable condition.

It is significant that the steel industry and now pig iron producers are approaching the problem of realizing a fair return on their respective investments through economical groupings and reductions in operating costs without passing additional charges to the consumer.

Steel Industry Placed in Fair Light

MILLIONS of Americans, and probably many thousands of persons in foreign countries, heard Charles M. Schwab inaugurate a series of radio talks by 13 celebrities on the subject of universal safety. The National Safety council, in asking the chairman of the Bethlehem Steel Corp. to take the lead in addresses broadcast through a network of radio stations, paid a tribute to the steel industry for pioneering and achieving results in the field of industrial safety. It has long been recognized that the American iron and steel companies made the first extensive, organized safety effort in behalf of its workers.

The most interesting part of Mr. Schwab's address, however, was that which referred to the great changes in human relationship between those who manage and those who labor. Mr. Schwab spoke from fifty years' experience in industrial management when he said: "American workers and managers appreciate that their interests are bound up in the prosperity of the industry itself." And: "To obtain co-operation of the heart as well as the hand requires leadership in industry that regards itself not as partisan but as a trustee striving to guide the efforts of both capital and labor into profitable channels."

Mr. Schwab hopes for the day "when we shall cease altogether to talk about a separation between labor and capital and begin to think of ourselves as contributing to a co-operative undertaking in the advancement of which every supervisor and every employe is an important and essential factor."

He voiced the spirit of the steel industry today to a vast radio audience. There was something impressive about the fact that whereas the industry a generation ago was a target and storm center for criticism, much of which was unfounded, the spokesmen of the industry now can step before a microphone and present the truth, and that the truth reveals the steel industry doing its full share toward the establishment of better human relationship.

IRON TRADE REVIEW

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E. L. SHANER, Editor. — *J. D. PEASE, Advertising Director.* — *F. F. LIGHT, Circulation Manager.*

One-hundred, thirty-ninth Article on Large Uses of Steel in Small Ways Features Foundry Flasks. Page 1121.

SINCE the introduction of tungsten-carbide tool steels some months ago, with descriptions of their remarkable properties, builders of machine tools have shown much interest in the design of their units, to obtain the full benefits of the new material. Users of machine tools also have been eager to obtain practical details concerning the alloys and the equipment best suited to them. The leading article in this issue throws considerable light on the subject, reporting the experiences and opinions of those who have been engaged in developing the material. It forecasts machine tool design and operation.

The Readers' Page

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The Business Trend

Industrial Construction Expands

By JOHN W. HILL, Financial Editor

ONE of the business records since the beginning of the year which is of special interest is that of building construction. With firmer money conditions prevailing, the only sign of any deterrent upon general industry from this cause is found in building. Other industries such as iron and steel, automobiles and machine tools have been making records.

ACCORDING to the F. W. Dodge Corp., the grand total of building contract awards by values in the first quarter of the year was $1,256,089,000. This compared with $1,485,067,000 in the like period of 1928. The reduction is 15 per cent. Analysis of the figures reveals that the largest loss is for residential building, with a decline of 34 per cent.

DURING the first quarter of the year the value of industrial building contract awards was $175,038,300. This compared with $121,655,000 in the corresponding period of 1928 and represents an increase of 44 per cent. Commercial building awards were up to a total of $244,226,000, a gain of 22 per cent.

IN ADDITION to residential building, public works and utilities fell off substantially, the total in the first quarter 1928 being $242,357,000 while that for the first quarter of 1929 was $195,623,000, a drop of 19 per cent.

THE large increase in industrial building partly explains the extraordinary boom that has been taking place in the machine tool business. Orders for machine tools have reached boom proportions. This leads the monthly review of the National Machine Tool Builders' association to remind the industry that "it is well to remember that boom conditions have never persisted for many months in the past" and to warn that some slackening is probable.

SHOULD our index of orders show any increase in cancellation, we should then take the warning very much at heart," continues the review. "There may not have been much duplication of orders as yet, but the industry should guard against the possibilities of concellation which have always developed up to this time in a market of the sort we are now witnessing."

The Barometer of Business

INDUSTRIAL INDICATORS

	March	One month ago	One year ago	Average 1913
Pig iron output (Daily average, tons)	119,575	114,883	103,493	83,900
Machine tool index	320.8	300	213	
Unfilled orders (tons)	4,410,718	4,144,341	4,335,206	4,513,000
Ingot output (Daily average, tons)	194,199	180,198	166,945	
Dodge Bldg., awards in 37 states (sq. ft.)	77,700,000	54,700,000	88,090,000	
Automobile output	595,000	501,445	425,000	
Coal output, tons	39,210,000	47,400,000	44,116,000	39,869,000
Business failures; number	1,987	1,965	2,236	1,336
Business failures; liabilities	$36,355,691	$34,035,772	$54,814,145	$22,732,000
Cement production, Bbls.	9,969,000	8,522,000	10,233,000	7,704,000
Cotton consumption bales	632,808	598,098	581,318	438,218
Car loadings (weekly average)	961,000	942,000	950,005	

FOREIGN TRADE

	March	One month ago	One year ago	Average 1913
Exports	$486,000,000	$444,000,000	$423,000,000	$194,000,000
Imports	$383,000,000	$371,000,000	$382,000,000	$149,900,000
Gold exports	$ 26,470,000		$ 97,576,000	$ 5,234,000
Gold imports	$ 1,635,000		$ 2,683,000	$ 5,900,000

FOREIGN EXCHANGE

	Normal	April 20	One month ago	One year ago
Sterling	$4.86	$4.84	$4.84	$4.87
Francs	19.3c	3.90c	3.90c	3.93c
Lira	5.26c	5.22c	5.22c	5.27c
Marks	23.8c	28.70c	28.70c	23.90c

FINANCIAL INDICATORS

	March	One month ago	One year ago	1913
25 Industrial stocks*	$360.10	$354.00	$268.88	$58.19
25 Rail stocks*	$127.91	$127.20	$123.36	$82.90
40 Bonds*	$88.38	$88.78	$93.46	$93.00
Bank clearings (000 omitted)	$63,261,000	$54,701,000	$55,491,000	$13,895,000
Commercial paper rate (N. Y., per cent)	6	5¾	4¼-4½	5.60
Commercial loans (000 omitted)**	$9,073,000	$8,850,000	*	
Federal Reserve ratio, per cent	72	69	74	
Railroad earnings†	$84,000,000	$77,261,000	$67,000,000	$59,301,000
Stock sales, N. Y. stock exchange	105,661,000	77,968,730	84,973,869	6,924,000
Bond sales, par value	$210,517,000	$176,802,000	$317,019,000	$41,499,000

*April 22, 1929.

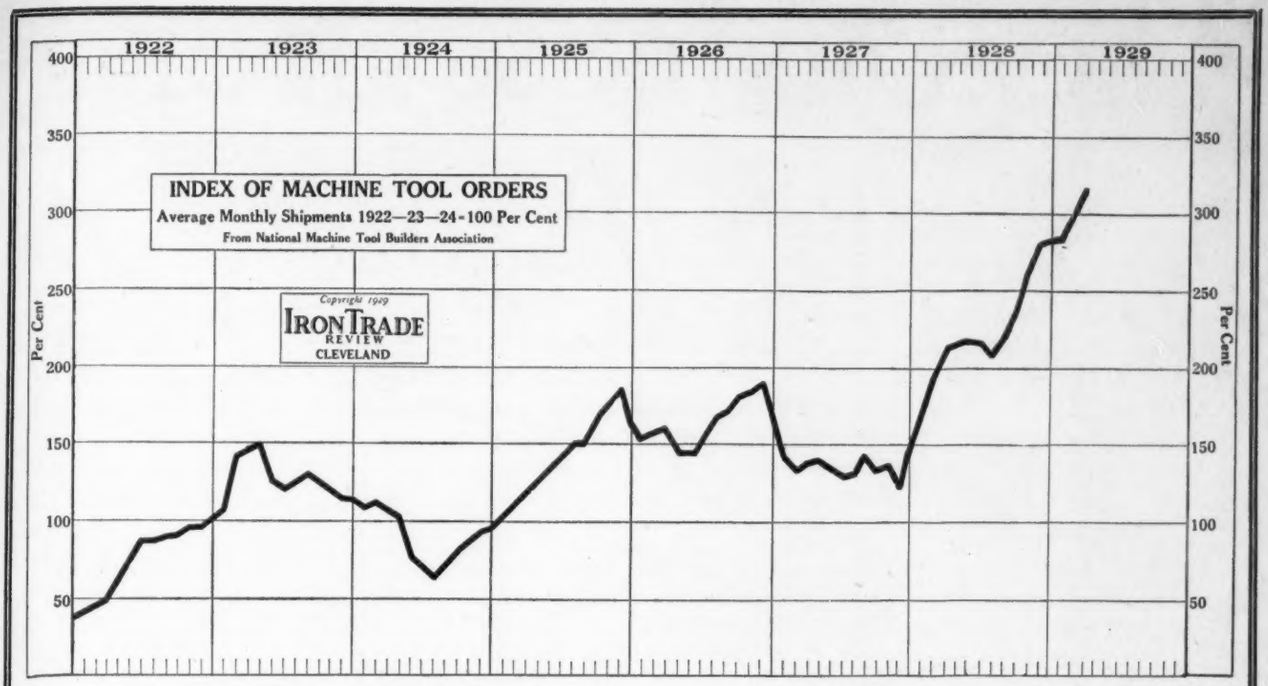
**Leading member banks Federal Reserve System.

†Feb., 1929.

COMMODITY PRICES

	April 1	One month ago	One year ago	1913
Iron Trade Review composite average of 14 iron and steel prices	$36.42	$36.28	$35.81	$26.82
Bradstreet's index	138.5	139.1	144	100
Wheat, cash (bushel)	$1.20	$1.31	$1.74	92c
Corn, cash (bushel)	92c	95c	98c	51c
Petroleum, crude (Bbl.)	$4.10	$4.10	$2.65	$2.50

The Business Trend

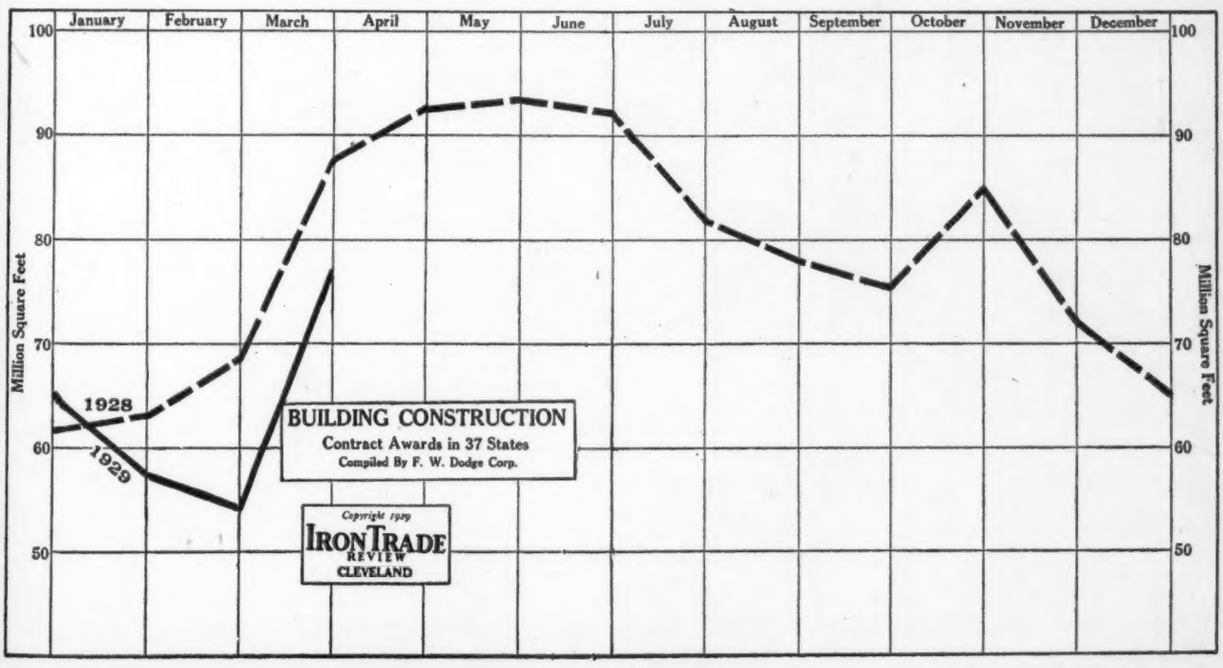


Machine Tool Index

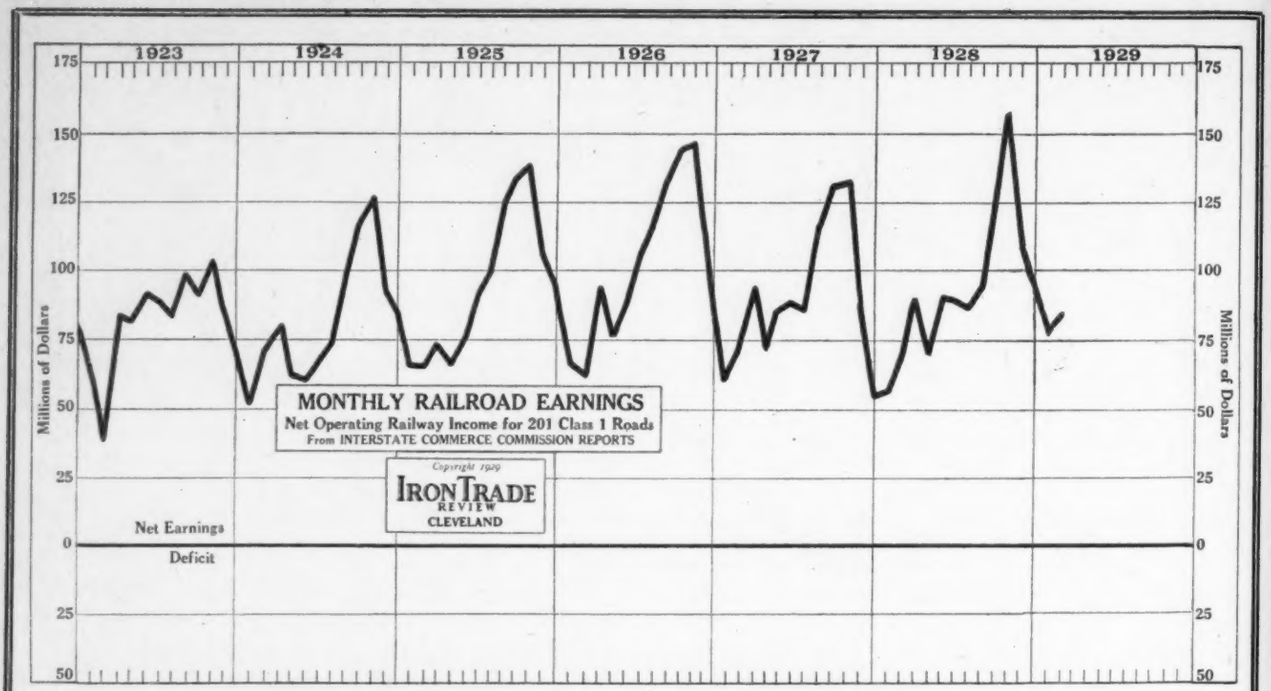
THE volume of machine tool bookings continues to spurt ahead. The three months moving average of gross orders compiled by the National Machine Tool Builders' association stood at 320 for the period ending with March. This compared with 300 in the preceding month and 213 one year ago. There is no similar record in recent years. The expansion in demand for machine tools reflects unusual industrial activity and requirements for new equipment, which will increase efficiency and lower cost.

Building Construction

BUILDING construction showed substantial increase in March compared with the preceding month. The total for the month, however, continued below the corresponding period one year ago. The grand total of contract awards for the month in 37 states amounted to 77,710,000 square feet, according to the F. W. Dodge Corp. This compared with 55,000,000 square feet one month before and 88,000,000 one year ago. Industrial construction was 9,498,000 square feet, compared with 7,100,000 one year ago.



The Business Trend

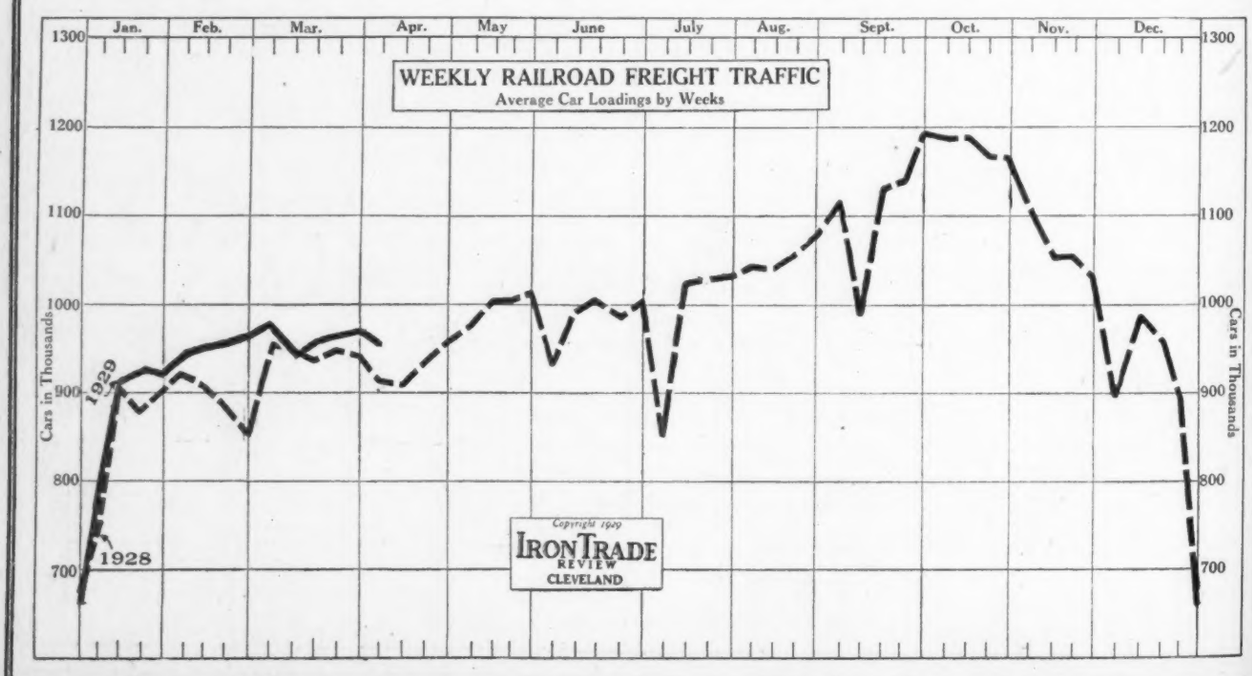


Railroad Earnings

NET income of class I railroads in February totaled $84,770,000, compared with $69,823,000 in February one year ago and with $77,000,000 in January of this year. The February net is the largest on record for the month by a wide margin. Gross income for the first two months of the year has shown an increase of 5.1 per cent, while operating expense has risen only 0.9 per cent. This gain in income reflects the larger volume of revenue freight traffic throughout the country.

Railroad Car Loadings

FREIGHT car loadings continue to run well ahead of those for 1928. The total for the week ended April 6 was 956,364 cars, compared with 919,352 cars in the corresponding week one year ago. This was an increase of 37,000 cars. The number of car loadings in the first week of April also exceeded that for the corresponding week in 1927, which was a previous record for the period. For the year to date revenue freight car movements are about 3 per cent over the like period of one year ago.



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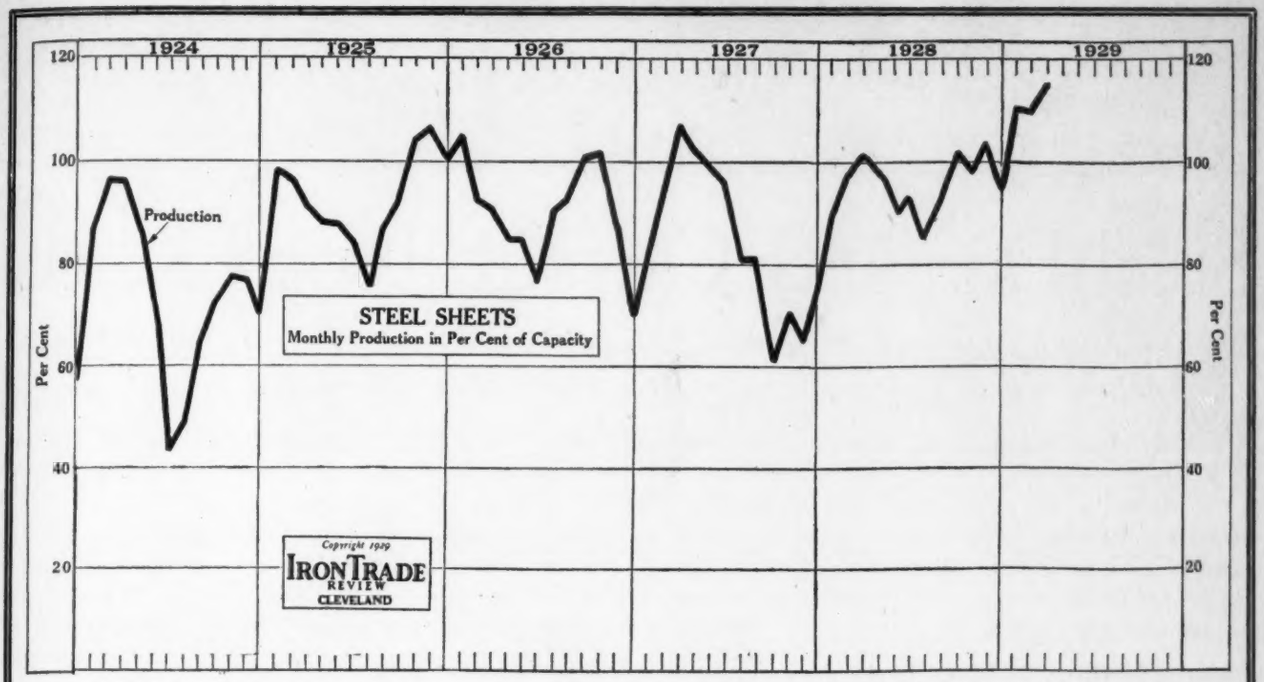
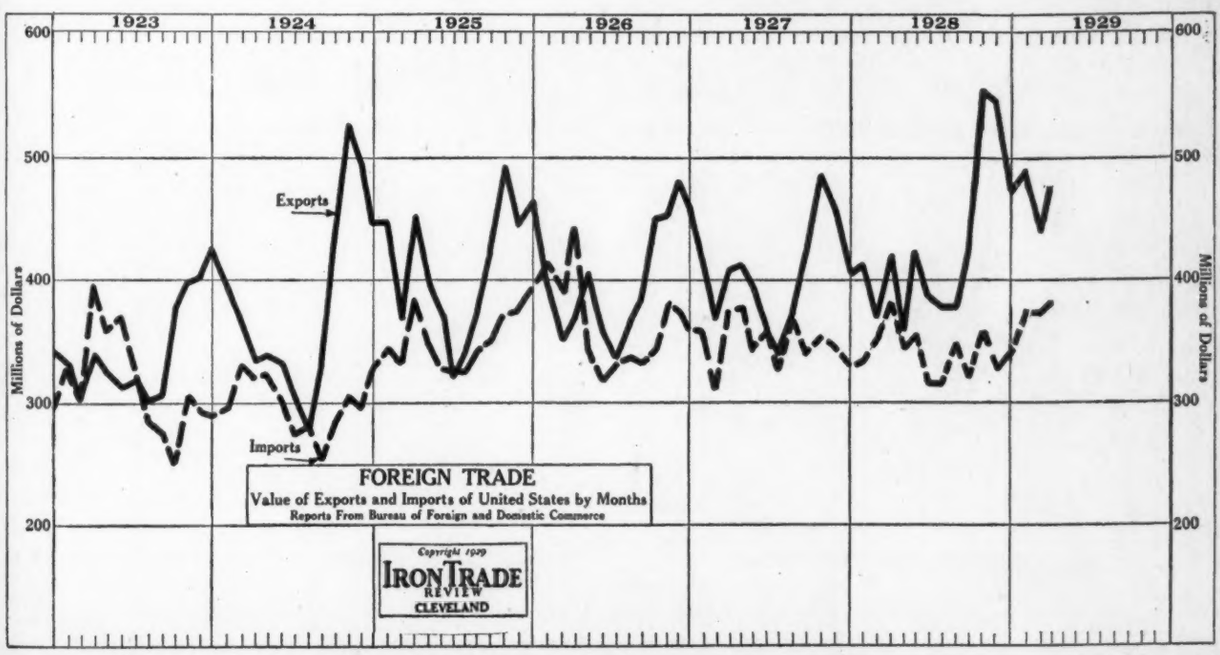


Steel Sheets

THE steel sheet industry maintained a swift pace during March. The report of activities for the month from the National Association of Flat Rolled Steel Manufacturers showed that production was at the rate of 115 per cent of capacity. This compared with 109.7 per cent of capacity in February. Sales for the month were at 146.8 per cent of capacity and unfilled tonnage was 250 per cent of capacity. The total number of hot mills in the United States is 722, with a total capacity of 468,200 net tons.

Foreign Trade

EXPORTS of American merchandise in March were valued at $486,000,000, compared with $440,000,000 in February and $420,600,000 in March, 1928. Imports of $383,000,000 were the highest for any single month since April, 1926. They compared with $371,000,000 in February and with $380,000,000 in March, 1928. The balance of trade favorable to this country in the month was $103,000,000. The large gain in exports is largely due to the continued heavy foreign shipments of machinery and automobiles.



Steel Demand, Output Drop Gently

Backlogs and Bookings, However, Insure Good Quarter—Mills Enter Repair Period—Plate Demands Heavy—Semifinished Up—Little Iron Sold

BY EASY stages steel demand is receding from its recent record level. Specifications of important producers are averaging 75 to 80 per cent of shipments, a relationship which is unusually good for the season and, considering backlogs, substantiates expectations of a record second quarter output.

Chicago Is Most Active District

By districts Chicago is an exception to this trend, as bookings of most products show little change, and by producers subsidiaries of the United States Steel Corp. are in a slightly better position than independents both as to operating rates and new business.

Seasonal shifts in requirements are taking up some slack. Whatever shrinkage develops in automotive sheet consumption in the next sixty days, for example, will be substantially offset by expanding needs of container manufacturers. Secondary buying of track material is noted, and specifications for tin plate are heavier.

Steelmaking is only fractionally off from the recent peak, though the necessity for repairs caused by capacity operations for a number of weeks becomes more urgent. Some changeover in equipment at Chicago has cut that district's rate from 98 to 95 per cent. Pittsburgh holds at 95 per cent and Buffalo at 90. In the Mahoning valley 48 independent open hearths out of 51, a gain of two, are active. Steel corporation subsidiaries are close to capacity, and independent producers at 96 per cent.

Price Structure Tends Toward Strength

The price situation generally continues strong, though it would be unusual if declining demand did not exert some pressure. Semifinished steel is up $1 to $2 per ton at Pittsburgh, with little material available. Sheetmakers claim strength for prices on the common grades. Water shipments of finished steel into Detroit, now beginning, take a lower freight than the all-rail movement. Some scrap dealers are beginning to discount a summer dip in consumption and short selling has appeared. A few sales of pig iron in the valley district have carried a 50-cent rise.

Plate requirements continue exceptional at

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	April 24, 1929	March 1929	Jan. 1929	April 1928
PIG IRON				
Bessemer, del. Pittsburgh	$20.26	20.11	19.96	19.26
Basic, valley	18.00	17.60	17.50	16.75
Basic, eastern del., eastern Pa.	20.50	20.25	20.15	19.25
No. 2 foundry, del. Pittsburgh	20.26	19.51	19.36	19.01
No. 2 foundry, Chicago	20.00	20.00	20.00	18.50
*Southern No. 2, Birmingham	15.50	16.00	16.50	16.00
**No. 2X, Virginia furnace	20.75	21.00	21.25	20.50
**No. 2X, eastern del. Phila.	22.26	22.26	22.26	21.26
Malleable, valley	18.50	18.10	18.00	17.25
Malleable, Chicago	20.00	20.00	20.00	18.50
Lake Superior charcoal, del. Chicago	27.04	27.04	27.04	27.04
Gray forge, val., del. Pittsburgh	19.26	19.11	18.76	18.56
Ferromanganese, del. Pittsburgh	109.79	109.79	109.79	104.79
*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.				
COKE				
Connellsville, furnace, ovens	2.75	2.95	2.75	2.60
Connellsville, foundry, ovens	3.75	3.75	3.75	3.65
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngstown	36.00	35.00	34.00	32.75
Sheet bars, open-hearth, Pittsburgh	36.00	35.00	34.00	34.00
Billets, open-hearth, Pittsburgh	36.00	34.00	33.00	33.00
Wire rods, Pittsburgh	42.00	42.00	42.00	44.00

	April 24, 1929	March 1929	Jan. 1929	April 1928
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.95	1.90	1.90	1.85
Steel bars, Chicago	2.05	2.05	2.00	2.00
Steel bars, Philadelphia	2.27	2.27	2.27	2.17
Iron bars, Chicago	2.05	2.00	2.00	2.00
Shapes, Pittsburgh	1.95	1.90	1.90	1.85
Shapes, Philadelphia	2.06	2.01	2.06	2.08
Shapes, Chicago	2.05	2.05	2.00	2.00
Tank plates, Pittsburgh	1.95	1.90	1.90	1.85
Tank plates, Philadelphia	2.15	2.10	2.10	2.10
Tank plates, Chicago	2.05	2.05	2.00	2.00
Sheets, black, No. 24, Pittsburgh	2.95	2.85	2.85	2.75
Sheets, blue anl., No. 10, Pittsburgh	2.20	2.10	2.10	2.05
Sheets, gal., No. 24, Pittsburgh	3.70	3.60	3.60	3.65
Sheets, black, No. 24, Chicago	3.10	3.10	3.00	3.05
Sheets, blue anl., No. 10, Chicago	2.35	2.35	2.25	2.25
Sheets, galvanized, No. 24, Chicago	3.85	3.85	3.75	3.90
*Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
*Wire nails, Pittsburgh	2.65	2.65	2.65	2.60
Tin plate, per base box, Pittsburgh	5.35	5.35	5.35	5.25
*To large jobbers.				
SCRAP				
Heavy melting steel, Pittsburgh	18.50	18.50	19.00	14.85
Heavy melting steel, eastern Pa.	17.00	16.25	16.50	13.75
Heavy melting steel, Chicago	16.00	15.55	16.50	12.75
No. 1 wrought, eastern Pa.	16.25	16.25	15.50	15.25
No. 1 wrought, Chicago	16.75	16.00	14.75	12.45
Rails for rolling, Chicago	17.50	17.50	17.10	14.00

Current Prices for Rolled Steel Products

PRICES IN CENTS PER POUND

STEEL PLATES

Pittsburgh, base	1.95c
Philadelphia, del.	2.15c to 2.25c
New York, del.	2.225c to 2.325c
Boston, del.	2.265c to 2.415c
Chicago, base	2.05c to 2.15c
Cleveland, delivered	2.14c
Lackawanna, N. Y., base	2.05c to 2.15c
Birmingham, base	2.10c to 2.20c
Coatesville, Pa., base	2.00c to 2.10c
Pacific Coast, c.i.f.	2.35c
St. Louis, del.	2.27c
Detroit, del.	2.19c to 2.24c

STRUCTURAL SHAPES

Pittsburgh, base	1.95c
Philadelphia, base	2.06c to 2.11c
New York, del	2.195c to 2.245c
Boston, del.	2.265c to 2.415c
Chicago, base	2.05c to 2.15c
Cleveland, delivered	2.14c
Lackawanna, N. Y.	2.05c to 2.15c
Birmingham, base	2.10c to 2.20c
Bethlehem, Pa., base	2.00c to 2.10c
Pacific Coast, c.i.f.	2.35c
Detroit, del.	2.19c to 2.24c

BARS

SOFT STEEL

Pittsburgh, base	1.95c
Chicago, base	2.05c to 2.15c
Birmingham, base	2.10c to 2.20c
Lackawanna, N. Y., base	2.05c to 2.15c
Pacific Coast, c.i.f.	2.35c
Cleveland, base, local mills	1.95c
Cleveland, del., outside mills	1.95c to 2.00c
Philadelphia, del.	2.27c to 2.37c
New York, delivered	2.29c to 2.39c
Boston, delivered	2.265c to 2.415c
Detroit, del.	2.19c to 2.24c
Pittsburgh, cold finishing	2.05c
Pittsburgh, forging quality	2.15c

RAIL STEEL

Chicago Heights	1.95c
Eastern mills	1.85c to 1.95c

IRON

Chicago, base	2.05c to 2.15c
New York, delivered	2.19c to 2.24c
Philadelphia, delivered	2.17c to 2.22c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pittsburgh, billet, cut lengths	2.25c to 2.30c
Stock lengths from mill	2.00c to 2.05c
Chicago, billet	2.35c to 2.40c
Chicago, rail steel	2.00c to 2.05c
Chicago, rail steel, road and bridge work	1.95c to 2.05c
Philadelphia, cut lengths	2.57c to 2.62c

SHEETS

SHEET MILL BLACK

No. 24, Pittsburgh, base	2.85c to 2.95c
No. 24, Philadelphia, delivered	3.27c
No. 24, Gary, Indiana Harbor	3.05c
No. 24, Chicago, delivered	3.10c
No. 24, Birmingham, base	3.10c
No. 24, St. Louis, del.	3.27c
No. 24, Pacif. coast ports, c.i.f.	3.50c

TIN MILL BLACK

No. 28, Pittsburgh, base	3.00c
No. 28, Gary, base	3.10c

GALVANIZED

No. 24, Pittsburgh, base	3.60c to 3.70c
No. 24, Philadelphia, delivered	4.02c
No. 24, Gary, Indiana Harbor	3.80c
No. 24, Chicago, delivered	3.85c
No. 24, Birmingham, base	3.85c
No. 24, St. Louis, del.	4.02c
No. 24, Pacif. coast ports, c.i.f.	4.25c

BLUE ANNEALED

No. 10, Pittsburgh, base	2.10c to 2.20c
No. 10, Philadelphia, delivered	2.42c to 2.52c
No. 10, Gary, Indiana Harbor	2.30c
No. 10, Chicago, delivered	2.35c
No. 10, Birmingham, base	2.35c
No. 10, St. Louis, del.	2.52c
No. 10, Pacif. coast ports, c.i.f.	2.725c

AUTOMOBILE

No. 20, Pittsburgh, base	4.10c
No. 20, Detroit, delivered	4.39c

FURNITURE

No. 24, Grade A, Pittsburgh	4.00c to 4.10c
No. 24, Grade B, Pittsburgh	3.80c to 3.90c

(Turn to the following page)

Pittsburgh and Chicago. Specifications prompted by recent freight car and river barge orders, with a fair sprinkling of tank work, equal the volume of a month ago. Capacity demand for all classes of plates has booked Chicago plate mill capacity into July.

Bar demands at Chicago closely approach plates, but in other districts a slight shrinkage is evident. Deliveries at Chicago are as distant as 14 weeks. Backlogs of Pittsburgh makers are lighter as automotive needs are less insistent. Structural steel awards continue to lag despite heavy public work in the East, and at Chicago light shape requirements for cars have filled structural mills. Concrete bar prices waver.

March a Record for Sheets

The strength of sheet demand is depicted by the record production and shipments by independent mills in March, leaving unfilled orders April 1 approximately 250 per cent of capacity. Farm implement manufacturers and carbuilders have expanded their orders, offsetting some losses at Pittsburgh from automotive buyers. A shortage of semifinished steel holds Chicago mills down to 85 per cent. In the Mahoning valley 117 out of 125 independent sheet mills, or one more than last week, are operating. Distribution of 3000 freight cars by the Baltimore & Ohio and 2500 by the Chicago & North Western, expected shortly, will place over 125,000 tons of steel on mill books. The Canadian National has placed an additional 1000 freight cars. Including 5 for export, 30 locomotives were placed this week. Secondary rail buying at Chicago includes 10,000 tons of rails and 3000 tons of fastenings.

Though strip steel specifications are slightly below the March level at Pittsburgh, deliveries have not eased appreciably. Backlogs at Chicago on cold rolled strip extend six to seven weeks. Shipments of cold finished bars are heavier than sixty days ago.

Ore Use Outrunning 1928 Considerably

As navigation opens pig iron is moving from Lake Erie ports to Chicago, about 30,000 tons having been sold for delivery in that district, and from Buffalo east by barge. High water is expediting barge shipments from the Birmingham district. All valley makers are quoting $18.50, base, on foundry iron. In most district shipments eclipse bookings. An indication of demand for pig iron is the fact consumption of Lake Superior iron ore is running 700,000 tons a month ahead of 1928.

Cast iron pipe business lags in the New York and Chicago districts, accounting in part for the weakness in southern pig iron. French makers have been awarded 5000 tons out of a distribution of 14,000 at Detroit, underbidding home makers.

Composite Market Average

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

This week (April 24, 1929)	$37.04
Last week (April 17, 1929)	36.82
One month ago (March, 1929)	36.42
Three months ago (January, 1929)	36.24
One year ago (April, 1928)	35.67
Ten years ago (April, 1919)	48.45
Fifteen years ago (April, 1914)	23.39

Advances in semifinished steel have put the IRON TRADE REVIEW composite of fourteen leading products up 22 cents this weeks, to $37.04, the highest point this index has touched since February, 1927.

Current Rolled Steel Prices

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED

Tubular Products Quoted On Last Editorial Page—See Preceding Page For Other Products

HOOPS, BANDS, STRIPS

Hot strip, to 6-in., Pitts.	2.00c
Hot strip 6 1/8 to 24-in., Pitts.	1.90c
Hot rolled strip, 12 to 24-inch 16 gage and heavier, coils or cut length, 1.90c plate basis, or 2.10c blue annealed basis.	
Hot strip, bands 6 in. and under, Chicago	2.10c to 2.30c
Do, 6 1/8 to 24 in.	2.00c to 2.10c
Cooperage stock, Pittsburgh	2.20c
Do, Chicago	2.30c
Cold rolled strip, hard coils, 16 inches and under by 0.100-inch and heavier, base Pitts., Cleve. (3 ton and over)	2.75c to 2.85c
Worcester, Mass. (3 tons and over)	3.10c to 3.20c

ALLOY STEEL

Hot Rolled

F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E. Series Number	Alloy differential	Net 100 lb. bars
2000	0.25	$2.90
2100	0.55	3.20
2300	1.50	4.15
2500	2.25	4.90
3100	0.55	3.20
3200	1.35	4.00
3300	3.80	6.45
3400	3.20	5.85
4100 0.15-0.25 Mo.	0.50	3.15
4100 0.25-0.40 Mo.	0.70	3.35
4600 0.20-0.30 Mo. 1.25-1.75 Ni.	1.05	3.70
5100 0.60-0.90 Cr.	0.35	3.00
5100 0.80-1.10 Cr.	0.45	3.10
5100 Chrome Spring	0.20	2.85
6100 Bars	1.20	3.85
6100 Spring Steel	0.95	3.60
Chrome Nickel Vanadium	1.50	4.15
Carbon Vanadium	0.95	3.60
9250 (flats)	0.25	2.90
9250 (rounds squares)	0.50	3.15

COLD FINISHED STEEL

Cold finished steel bars drawn or rolled, Pitts., Chi., c.l.	2.30c
Do, del. Detroit	2.575c
Shafting (turned, polished) Pittsburgh	2.30c
Shafting (turned, ground) mill (Depending on size, 1 3/16 to 7-inch)	2.65c to 3.10c
Cold finished steel bars, Cleve.	2.25c to 2.35c

WIRE PRODUCTS

F.o.b. Pittsburgh, Cleveland, Ironton base

(Per pound)	Dealer trade	Large jobbers
Bright plain wire, 6 to 9 gage	2.60c	2.50c
Annealed field wire	2.75c	2.65c
Galvanized wire	3.20c	3.10c
Barbed wire, galvanized	3.40c	3.30c
(Per 100-pound keg)		
Wire nails	$2.75	$2.65
Galvanized nails	4.75	4.65
Polished staples	3.20	3.10
Galvanized staples	3.45	3.35
Cement coated nails	2.75	2.65
Manuf. wire, del. Detroit		2.735c
Wire nails, del. Detroit		$2.885

Joliet, DeKalb and Waukegan, Ill., Anderson, Ind., and Chicago prices $1 per ton over Pittsburgh-Cleveland-Ironton base on products made there; Duluth $2 higher; Worcester, Mass., Fairfield, Ala., $3 higher.

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

Anderson, Ind., $1 higher, Chicago $2 higher, Duluth, Birmingham $3 higher.

CUT NAILS, CHAIN PILING

Cut nails, c.l., f.o.b. mills	2.75c
Cut nails, l.c.l. f.o.b. mills	2.85c
Chain, 1-in., proof coil, Pitts.	6.00c
Sheet piling, base, Pittsburgh	2.25c

CAST IRON WATER PIPE

Prices per net ton

Class B pipe

Six-inch and over, Birming'm	$37.00 to 38.00
Four-inch, Birmingham	41.00 to 42.00
Four-inch, Chicago	49.20 to 50.20
Six-inch to 24-inch, Chicago	45.20 to 46.20
Four-inch, New York	41.80 to 43.80
Six-inch and over, New York	38.80 to 40.80
Standard fittings, Bir. base	$100.00

Six to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $10; 3-inch, plus $20 gas pipe fittings, $5 higher.

Class A pipe is $4 higher than Class B.

TIN AND TERNE PLATE

Prices per 100-pound box Pittsburgh

*Tin plate, coke base	$5.35

Gary, Ind., base 10 cents higher.

Long ternes, primes, No. 24.. 4.00c to 4.10c

*Price subject to quantity differentials.

WASHERS

Wrought, c.l., Pitts. dist.	$6.50 to 6.75 off
Wrought, c.l., Chicago dist.	$6.70 to 6.90 off
Lock: to dealers	85-5 off
Lock: to consumers	85 off

RAILS, TRACK MATERIAL

Standard bessemer rails, mill	$43.00
Standard open-h'th rails, mill	$43.00
Relaying rails, St. Louis	$24.00 to 31.00
Relay rails, Pitts., 60 to 90 lb.	$22.00 to 27.00
Light rails, 25 to 45, mill	$36.00
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.80c
Spikes, small railroad, 7/16-inch and smaller, Pitts.	2.80c
Spikes, boat and barge, Pitts.	3.00c
Spikes, railroad, Chicago	2.80c
Track bolts, Pitts., steam roads	3.80c
Track bolts, Pitts., stand, jobbers	70 off list
Track bolts, Chicago	3.80c
Tie plates, Chicago, Pitts.	$43.00

BOLTS AND NUTS

Birmingham and Chicago

Discounts are for legitimate jobbing or large consuming trade purchasing in full-case lots, apply to lists of April 1, 1927.

Small lots are 55 to 60 per cent off.

CARRIAGE BOLTS

All sizes, cut thread	60 to 70 off
Rolled thread 3/8 x 6 and smaller take 10 per cent lower list.	
Eagle list	60 to 70 off

MACHINE BOLTS

All sizes, cut thread	60 to 70 off
Rolled thread 3/8 x 6 and smaller take 10 per cent lower list.	
Lag screws	60 to 70 off
Plow bolts, Nos. 1-2-3-7 heads	60 to 70 off
Tap bolts	60 to 70 off
Blank bolts	60 to 70 off
Stud bolts without nuts	60 to 70 off
Stove bolts, 75, 20, 10 and 5 off in pkgs., 75, 20, 10 and 5 with 2½ off in bulk.	
Tire bolts	60-5 off

Nuts

Semifinished	60 to 70 off

HEXAGON CAP SCREWS

Milled	80-10-5 off
Upset 1 in. diam. and smaller	85-off

SQUARE HEAD SET SCREWS

Milled	80-5 off
Upset 1 in. diam. and smaller	80-10-5 off

RIVETS

Struc., c.l., Pitts-Cleve.	3.10c
Structural, c.l. Chicago	3.20c
**7/16-inch and smaller, Pitts.	70 and 10 off
Chi., Cleve.	70 to 70 and 10 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Raw Materials and Semifinished Products

SEMIFINISHED MATERIAL

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$34.00 to 36.00
Pittsburgh, bessemer	34.00 to 36.00
Youngstown	34.00
Cleveland	34.00
Philadelphia	39.30
Chicago	35.00 to 37.00
Forging, Chicago	40.00
Forging, Pittsburgh	39.00 to 41.00
Forging, Philadelphia	44.30

SHEET BARS

Pittsburgh	$35.00 to 36.00
Youngstown	35.00 to 36.00
Cleveland	35.00
Chicago	35.00

SLABS

Pitts., Young., and Cleve.	$34.00 to 36.00

WIRE RODS

Pittsburgh, Cleveland	$42.00
Chicago	43.00

SKELP

All grades, Pittsburgh	1.90c to 1.95c

IRON ORE

LAKE SUPERIOR ORE

Per Gross Ton, Lower Lake Ports

Old range nonbessemer, 51½%	4.65
Mesabi bessemer, 51½%	4.65
Old range nonbessemer, 51½%	4.50
Mesabi nonbessemer, 51½%	4.50
High phosphorus, 51½%	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%	8.00
Copper free low phosphorus 58 to 65 per cent	nominal

FOREIGN ORE

Cents per unit, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-8% manganese	10.50 to 11.00
North African low phosphorus	11.50 to 11.75
Swedish foundry or basic, 65%	9.00 to 10.00
Spanish and North African basic, 50 to 60 per cent	10.00 to 11.00
Newfoundland foundry, 55%	8.50 to 9.00
Tungsten spot and early fut., short ton unit, duty paid	15.00 to 15.25

MANGANESE ORE

Prices do not include duty of 1 cent per pound of metallic manganese contained.

Brazilian	34 to 36 cents
Indian	34 to 36 cents
Caucasian, (53-55 per cent)	36 to 38 cents

FLUORSPAR

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton	$18.00
Washed gravel, imported duty paid east. tide., gross ton	$20.40

REFRACTORIES

FIRE CLAY BRICK

Per 1000 f.o.b. works

First Quality

Pennsylvania	$43.00 to 46.00
Ohio	43.00 to 46.00
Illinois	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Maryland	43.00 to 46.00
Georgia and Alabama	40.00 to 45.00

Second Quality

Pennsylvania	35.00 to 38.00
Ohio	35.00 to 38.00
Illinois	35.00 to 38.00
Kentucky	35.00 to 38.00
Missouri	35.00 to 38.00
Maryland	35.00 to 38.00
Georgia and Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham	50.00 to 51.00

MAGNESITE BRICK

Pet Net Ton

9 x 4½ x 2½	65.00

MAGNESITE

Net Ton Chester, Pa., and Baltimore base

Dead-burned grain magnesite	40.00

CHROME BRICK

Net ton Chester, Pa., and Baltimore base

9 x 4½ x 2½	45.00

Pig Iron

Valley Prices Advanced 50 Cents on Base Grades—Heavy Shipments Engaged for Chicago District from Eastern Lake Furnaces

A RENEWAL of strength in the valley pig iron market is the outstanding feature of the week. All sellers now hold for $18.50 base, valley, and the market appears fairly well established at this level, although large orders are lacking. Buffalo iron continues to display strength, at $19, base, for outside delivery, large shipments going by barge to eastern points and to Chicago-Milwaukee district by lake freighters. From 25,000 to 30,000 tons of pig iron has been sold for shipment into the latter territory from eastern lake furnaces at delivered prices 50 to 75 cents under the current Chicago quotations, but these do not seem to have disturbed the Chicago market. Makers are heavily booked and shipments continue at approximately the March rate.

PITTSBURGH, April 23.—Pig iron sellers are obtaining orders for small lots, but are meeting with fair success in their attempts to establish an advance of 50 cents a ton on all grades, now in effect in the asking prices of all producers. Demand for foundry iron is the most active and aggregates several thousand tons of the No. 2 grade, all reported placed at $18.50, base, valley, at which level this grade is fairly well established. One order for 800 tons, understood to have been closed at $18, is said to have been placed prior to the recent advance. Some sales of bessemer are noted at $19, valley, but the tonnage is small. Malleable iron is quiet. Activity in basic is restricted, and although sales are lacking sellers claim no iron is available at less than $18.50. Some inquiries have been received for third quarter, but only one or two tonnages have been placed for that period.

New York, April 23.—New York Air Brake Co. has closed for 1500 tons of malleable and 500 tons of foundry iron. Buffalo foundry iron continues firm at $19, base, furnace, and malleable $19.50, base, Buffalo. Production schedules at some foundries have fallen off, but others report an increased melt. Shipments against contracts continue heavy. Due to recent advances in pig iron in England, the minimum now quoted on English low phosphorus iron appears to be $23.50, duty paid, tidewater.

Boston, April 23.—Pig iron sales totaled 3000 tons in the past week, of which 1000 tons was booked by the Mystic Iron Works. Prices are firm. One Buffalo furnace is reported to have taken a small tonnage for third quarter. The price is $19, base, Buffalo. The Mystic Iron Works is accepting business on a basis equivalent to $18.50 to $19, Buffalo.

Buffalo, April 23.—Small lots of pig iron are bringing $19.50, Buffalo, for No. 2 plain foundry and $20 for malleable to district melters. Prices for eastern delivery are 50 cents to $1 lower than these. Shipments are heavy. Barges and Great Lakes steamers are moving iron by water to eastern and western ports. There are practically no stocks here. The 14 district furnaces now making iron will operate the rest of the quarter.

Cleveland, April 23.—Pig iron consumption continues at the high rate noted for several months, with the automotive industry leading, and the stove and agricultural implement makers contributing in large measure. Producers see no recession in consumption this quarter. Little business has been booked for third quarter, as consumers' schedules have not yet been determined. More interest is manifested in the market since additional valley blast furnaces have advanced prices 50 cents a ton to a minimum of $18.50, base, furnace, for foundry iron. This is a result of the sold-up condition of furnaces, as new sales are relatively light. So far Cleveland furnaces have not changed prices, which are $18.50, base, furnace, for outside shipment and $19, base, for local consumption. Usual prices for shipment in western Ohio, Indiana and lower Michigan, quoted by nearby lake furnaces, are $20.50, base, furnaces, for foundry and $21 for malleable. Furnace interests with headquarters in Cleveland booked 16,000 tons the past week. American Steel Foundries has issued a general inquiry from Chicago for 5000 to 6000 tons of basic, point of delivery not being specified.

Pig Iron Prices

Per Gross Ton

Bessemer, valley furnace	$18.50 to 19.00
Bessemer, del. Pittsburgh	20.26 to 20.76
Basic, valley furnace	18.00 to 18.50
Basic, del. Pittsburgh	19.76 to 20.26
Basic, Buffalo furnace	17.50
Basic, del. eastern Pa.	20.50 to 21.00
Malleable, valley furnace	18.50 to 19.00
Malleable, del. Pittsburgh	20.26 to 20.76
Malleable, Cleve. fur. for local del.	19.00
Malleable, Chicago furnace	20.00
Malleable, Buffalo furnace	20.00
Malleable, del. eastern Pa.	22.26 to 22.91
Malleable, Granite City fur.	20.50
No. 1 foundry, Chicago furnace	20.50
No. 1X, eastern del., Phila.	22.76 to 23.26
No. 1X, Buffalo furnace	21.00
No. 2 foundry, valley furnace	18.50
No. 2 foundry, del. Pittsburgh	20.26
No. 2 plain, Buffalo furnace	19.50
No. 2 foundry, Chicago furnace	20.00
No. 2 fdy. Cleve. fur. for local del.	19.00
No. 2 plain, del., Phila.	21.76 to 22.26
No. 2 plain, Virginia furnace	20.75
No. 2 plain, Buffalo, del. Boston	22.91 to 23.91
No. 2 plain, N. J., tidewater	22.28 to 22.78
No. 2 Alabama, Bir. base	15.50
No. 2 Tenn., Birmingham base	15.50
No. 2 Tenn., del. Cincinnati	19.19
No. 2 Alabama, del. Cincinnati	18.69 to 19.19
No. 2 Alabama, del., Chicago	21.51
No. 2 Alabama, del., Cleveland	21.76
No. 2 Alabama, del. St. Louis	19.92
No. 2X, east, N. J., tidewater	22.78 to 23.28
No. 2X, eastern, del. Phila.	22.26 to 22.76
No. 2X, foundry, Buffalo furnace	20.00
No. 2X, Buffalo, del. Boston	23.41
No. 2X, Virginia furnace	20.25 to 20.75
Gray forge, val., del. Pittsburgh	19.76
Low phos., standard, valley	27.00
Low phos., standard, Phila.	24.26 to 24.76
Low phos., copper bearing fur.	23.00 to 23.50
Charcoal, Superior, del., Chicago	27.04

CANADIAN PRICES

No. 2 foundry, del. Toronto	24.10
No. 2 foundry, del. Montreal	25.50 to 26.00
Malleable, del. Toronto	24.10
Malleable, del. Montreal	25.50 to 26.00
Basic, del. Montreal	24.50 to 25.00

Silvery iron, Jackson county, O., furnaces, in per cents: 5—$23 to $24; 7—$25 to $26; 8—$26 to $27; 9—$27 to $28; 10—$29 to $30; 11—$31 to $32; 12—$33 to $34; 13—$35 to $36.

Bessemer ferrosilicon, Jackson county, O., furnaces, in per cents: 10—$31 to $32; 11—$33 to $34; 12—$35 to $36; 13—$37 to $38; 15—$41.50 to $42.50; 16—$43 to $44.

Youngstown, O., April 23.—Leasing of Cherry Valley and Sharpsville stacks, respectively, of Hanna Furnace Co. and E. W. Mudge & Co. by Davison Coke & Iron Co., Pittsburgh, as yet has exerted no influence on the local pig iron trade. Small lots of foundry and malleable pig iron continue to be sold and shipped, these bringing $18.50, valley for No. 2 foundry and $19, furnace, for both malleable and bessemer. Important producers still are unable to let go large tonnages, requiring pig iron for their own open-hearth operations and to fill long-term contracts.

Cincinnati, April 23.—Pig iron consumers apparently are well covered for second quarter. The northern iron market continues firm. Birmingham prices have been shaded 50 cents to $15.

St. Louis, April 23.—Purchasing of pig iron continues relatively quiet, while consumption is increasing. Additional inquiries for third quarter have appeared, but little tonnage has been placed for that delivery. Sales reported in the past week total 4200 tons, the largest single lot being 1000 tons of foundry iron booked by the leading local producer for a Kansas City radiator maker. Illinois malleable plants took 1000 tons. The movement of southern iron is particularly heavy. The favorable stage of the rivers is permitting unusually large shipments from Alabama blast furnaces by barge and rail. Prices are firm.

Birmingham, Ala., April 23.—The pig iron market is quiet. Shipments have fallen below output and furnaces are accumulating stocks. Home consumption is less active than it has

(*Concluded on Page* 1159)

Coke

Market Is Quieter, While Shipments Continue Active—Leading Companies Cut Wages

NEW orders for furnace and foundry coke are developing slowly, though shipments are holding up and the market is steady. Output generally is being curtailed, while the leading interest in the Connellsville district is starting 1050 additional ovens. A reduction of 7 per cent in wages of soft coal miners has been announced by some Pittsburgh coal companies.

Pittsburgh, April 23.—Beehive coke is in a dull market. Demand for standard furnace fuel is lacking. Production still is being reduced, but coke is available from small operators. Large producers are filling contracts and not anxious for spot business. The market for prompt shipment remains $2.75 to $2.85. Occasionally inquiries appear for a few carloads daily over a short period, but furnaces generally are not interested in additional supplies. The H. C. Frick Coke Co. has started 1050 ovens in the Uniontown district, reflecting sustained pig iron and steelmaking operations. Foundry demand is fairly active, although slightly slower than a few weeks ago.

Unsatisfactory conditions in the Pittsburgh district soft coal market are reflected in a wage cut of 7 per cent by Pittsburgh Coal Co. and Carnegie Coal Co. These reductions follow similar decreases placed in effect since Jan. 1 by operators in this district and West Virginia. The present reduction by the Pittsburgh Coal Co. is the first since January, 1928. This company has been on a nonunion basis for some time.

Production of coke in the Connellsville region for the week ended April 13 was 69,095 tons, compared with 72,850 tons the preceding week, according to the *Connellsville Courier*.

New York, April 23.—While shipments against first half foundry coke contracts continue brisk, spot buying is smaller than sellers had expected since many consumers are not under contract. Beehive foundry continues $3.75 to $4, Connellsville, and $4.85, Latrobe, Pa. By-product foundry coke continues $11, delivered at most New England consuming points, $9 to $9.40, delivered at Newark, N. J., and $11, delivered at Philadelphia.

Boston, April 23.—Foundry coke demand is fair, and the market is satisfactory. Prices are steady.

Buffalo, April 23.—Merchant coke ovens continue at capacity. Foundry coke shipments are fully up to production, with the price firm at $9.

Cincinnati, April 23.—Although specifications for by-product foundry coke are below last month's rate, dealers anticipate better business in May. The market continues firm.

St. Louis, April 23.—Demand for metallurgical coke holds up well. The melt at jobbing plants and stove foundries has increased, and their stocks are light. Prices are steady.

Birmingham, Ala., April 23.—Demand for coke is easing off, but production has not been curtailed to any great extent. By-product foundry coke still is $5, base, Birmingham.

Coke Prices

Prices per Net Ton

Beehive Ovens	
Connellsville furnace	$2.75 to 2.85
Connellsville foundry	3.75 to 4.85
New River foundry	6.00 to 6.50
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.75
By-Product Foundry	
Newark, N. J., del.	9.00 to 9.40
Chicago ovens	8.00
New England del.	11.00
St. Louis del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell. basis	6.50
Portsmouth, O., ovens, Connell. basis	6.50
Buffalo, ovens	8.75
Detroit, ovens	9.00
Philadelphia, del.	9.00

Ferroalloys

Market Firm—Shipments Approximate March Rate

Pittsburgh, April 23.—Little new ferroalloy business has developed although sellers continue to receive single carload orders from small buyers for ferromanganese and spiegeleisen. Current prices of $109.79, delivered Pittsburgh, for ferromanganese and $34 to small-lot buyers of spiegeleisen are well maintained. Shipments so far this month are holding approximately to the heavy March rate.

Some contracts have been closed recently for fluorspar held at $18. Shipment will be renewed with warmer weather.

New York, April 23.—Consumptilon of ferromanganese and spiegeleisen is at the heaviest rate in history. Producers report shipments so far in April show no letdown from the heavy movement of March. Shipments of special ferroalloys continue unusually large and prices are unchanged. Tungsten ore is strong, but prices are nominal, mainly $15, a short ton unit, duty paid.

Malleable Output Record

Washington, April 23.—Malleable castings production in March reached the highest total since the department of commerce began compiling monthly statistics. Operations in March were about 15 per cent over last March, as the following comparison shows:

	Total tons produced	Per cent of capacity	Bookings	†Monthly capacity
1928				
January	61,072	62.7	62,328	97,424
February	65,359	66.8	64,419	97,797
March	70,070	73.0	70,288	96,040
April	63,380	66.0	62,056	96,004
May	67,903	70.7	63,847	95,981
June	67,090	69.9	61,071	95,944
July	60,290	63.1	60,964	95,544
August	68,606	72.1	66,128	95,101
September	62,665	66.3	61,163	94,481
October	70,054	73.4	65,780	95,504
November	63,560	66.8	59,664	95,080
December	59,432	63.4	61,319	93,773
Total	779,481	67.9	759,027	1,148,673
1929				
January	73,169	77.5	77,091	94,420
February	74,683	77.7	79,104	96,116
*March	84,496	88.6	87,739	95,368

*Preliminary.

†Capacity during 1927 has been based on following formula: "Total number of units of molding floor space times average production per molder per day per unit of floor space, times number of actual working days per month." Beginning January, 1928: "Average monthly production for the best six consecutive months since Jan. 1, 1919, is to be taken as a practical monthly capacity."

Bolts, Nuts, Rivets

April Specifications Hold Well up to March Rate

NUT AND BOLT PRICES, PAGE 1144

Pittsburgh, April 23.—April compares favorably with March in specifications for bolts, nuts and rivets. Demand is well distributed. Most of the tonnage is confined to specifications against contracts, although occasional spot buying is done. Prices are steady at 60 to 70 off for bolts and nuts and 3.20c, Pittsburgh, for large rivets.

Chicago, April 23.—Specifications for bolts and nuts show sporadic gains, although total volume is slightly under last year. Automotive orders are holding up well and tractor plants are taking steady requirements.

Ferroalloy Prices

(In dollars, except ferrochrome)

Ferromanganese, 78 to 82 per cent, tidewater, duty paid	$105.00
Ferromanganese, del. Pittsburgh	109.79
Spiegeleisen, 19 to 21 per cent, domestic furnace, spot†	34.00
*Ferrosilicon, 50 per cent, freight allowed, carloads	83.50
*Do, less carload	88.50
Do., 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. per lb. con., del.	11.00
Do., for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.30 to 1.35
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload, producer's plant, net ton	160.00
Do., one ton to carload	170.00
Ferrophosphorus, per ton, carload 17 to 19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic, per ton, carload, 23-25% f.o.b. Anniston, Ala. (24 per cent)	122.50

†Quantity diff. apply on 100 tons and over.
*These prices contract, spot $5 higher.

Scrap

Lack of Activity Brings Signs of Weakness but Prices Yield Little—Movement Light

SIGNS of weakness have appeared in the market for iron and steel scrap, as buying has declined. However, prices have not yielded, except fractionally, and the change is confined to only a few grades. Some short selling is being done. Small tonnages are the only ones now being negotiated.

Chicago, April 23.—Weakness has developed in iron and steel scrap, but thus far has been confined largely to steelmaking grades. Electric furnace grades, malleable and specialty scrap are maintaining the strength that has prevailed since early in the year. Moderately heavy short selling is developing, particularly in steelmaking grades and, due to restrictions in shipments of heavy melting steel and other scrap, distress cars have appeared. A number of dealers are discounting expected sporadic declines in steelworks and casting operations in this district within the next 30 to 60 days. Gray iron foundry grades, which have recently picked up, are maintaining fair strength. Most sellers again have revised quotations downward on cast borings 25 cents to 50 cents. Both agricultural and railroad malleable are in strong demand, and frogs, switches and miscellaneous rails have been moving well. Iron car axles have advanced as much as 75 cents in recent sales. Higher prices in surrounding markets have taken some material ordinarily going to this district. Railroad offerings are slightly heavier.

Boston, April 23.—Buyers and sell-

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except Detroit where dealers' buying prices are shown

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	12.00 to 12.50
Boston, dealers	12.00 to 12.50
Boston, No. 2	10.00 to 10.50
Buffalo, No. 1	17.00 to 17.50
Buffalo, No. 2	14.50 to 15.00
Chicago	16.00 to 16.50
Cincinnati, deal.	13.50 to 13.75
Cleveland, No. 1	15.75 to 16.00
Cleveland, No. 2	15.25 to 15.50
Buffalo, No. 1	17.00 to 17.50
Detroit, No. 2	12.25 to 12.75
East Pa., del. mill	17.00
N. Y., deal., R. R.	13.00 to 13.50
N. Y., deal., yd.	8.25 to 9.50
Pittsburgh, No. 1	18.25 to 18.75
Pittsburgh, No. 2	16.25 to 16.75
Pittsburgh, railroad	19.25 to 19.50
St. Louis, No. 1	14.25 to 14.75
Valleys, No. 1	18.00 to 18.50

COMPRESSED SHEETS

Buffalo (dealers)	14.50 to 15.00
Chicago	13.75 to 14.25
Cleveland	15.00 to 15.50
Detroit	14.00 to 14.25
E. Pa. new mat.	14.50
Pittsburgh	18.25 to 18.75
Valleys	18.00 to 18.25

BUNDLED SHEETS

Buffalo	12.75 to 13.25
Cincinnati, deal.	11.00 to 11.50
Cleveland	13.00 to 13.50
Eastern Pa.	11.50 to 12.00
Pittsburgh	16.50 to 17.00
St. Louis	10.00 to 10.50

SHEET CLIPPINGS LOOSE

Chicago	9.00 to 9.50
Cincinnati	9.75 to 10.25
Detroit	9.25 to 9.75
St. Louis	10.00 to 10.50

STEEL RAILS, SHORT

Birmingham	13.00 to 14.00
Boston	11.25 to 12.25
Buffalo	19.50 to 20.00
Chicago (3 feet)	19.00 to 19.50
Chicago, 2 ft. and under	20.00 to 20.50
Cincinnati, deal.	19.00 to 19.50
Detroit	17.00 to 17.50
Pittsburgh (3 ft.)	20.50 to 21.50
Pittsburgh 2 ft. and under	21.00 to 22.00
St. Louis	16.75 to 17.25

STOVE PLATE

Birmingham	13.00 to 13.25
Boston consumers	11.50 to 12.00
Buffalo	13.50 to 13.75
Chicago, net	12.75 to 13.25
Cinn., deal., net	10.00 to 10.50
Detroit, net	9.00 to 9.50
Eastern Pa.	12.50 to 13.00
N. Y. deal., mill	8.75 to 9.00
Pittsburgh	12.50 to 13.00
St. Louis	13.75 to 14.25

COUPLERS, SPRINGS

Buffalo	19.50 to 20.00
Chicago	17.00 to 17.50
Eastern Pa.	20.00 to 21.00
Pittsburgh	21.00 to 22.00
St. Louis	15.75 to 16.00

ANGLE BARS—STEEL

Chicago	17.50 to 18.00
St. Louis	15.50 to 15.75

LOW PHOSPHORUS

Buffalo, billets and bloom crops	19.50 to 20.50
Eastern Pa.	21.00 to 22.00
Pitts. billet and bloom crops	23.00 to 24.00
Cleve. billet and bloom crops	17.50 to 18.00

FROGS, SWITCHES, GUARDS

Chicago	17.25 to 17.75
St. Louis	15.50 to 16.00

SHOVELING STEEL

Chicago	16.00 to 16.50
Cleveland	11.75 to 12.00
Detroit	10.75 to 11.00
Pittsburgh	18.25 to 18.75
St. Louis	14.00 to 14.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	10.00 to 11.00
Boston, dealers	12.00 to 12.50
Buffalo, No. 1	13.50 to 14.00
Buffalo, No. 2	16.00 to 17.00
Chicago, No. 1	16.75 to 17.25
Chicago, No. 2	16.00 to 16.50
Cinn., No. 2	13.50 to 14.00
Eastern Pa.	16.00 to 16.50
N. Y., No. 1 deal.	12.00 to 12.50
Pittsburgh, No. 2	19.25 to 19.50
St. Louis, No. 1	13.75 to 14.25
St. Louis, No. 2	14.00 to 14.50

SPECIFICATION PIPE

Boston	10.75 to 11.00
Eastern Pa.	15.50 to 16.00
New York, deal.	11.25 to 11.75

BUSHELING

Buffalo, No. 1	14.50 to 15.00
Chicago, No. 1	13.75 to 14.25
Cinn., No. 1 deal.	11.00 to 11.50
Cinn., No. 2	8.00
Cleveland, No. 1	13.00 to 13.50
Cleveland, No. 2	11.25 to 11.50
Detroit, No. 1	12.50 to 13.00
St. Louis, No. 1	10.00 to 10.50

MACHINE SHOP TURNINGS

Birmingham	7.00 to 8.00
Boston	6.75 to 7.00
Buffalo	7.75 to 8.25
Chicago	9.00 to 9.50
Cincinnati, deal.	9.00 to 9.25
Cleveland	9.50 to 10.00
Detroit	7.25 to 7.50
Eastern Pa.	11.50
New York, deal	8.00
Pittsburgh	11.25 to 11.75
St. Louis	8.00 to 8.50
Valleys	11.50 to 12.00

MIXED BORINGS, TURNINGS
For blast furnace use

Boston, dealers	6.25 to 6.50
Buffalo	11.50 to 12.00
Cincinnati, deal.	9.25 to 9.75
Cleveland	11.25 to 11.50
Detroit	9.00 to 9.25
Eastern Pa.	10.00 to 10.50
New York, deal.	6.50 to 7.00
Pittsburgh	12.00 to 13.00

CAST IRON BORINGS

Birmingham, chem.	13.00 to 13.50
Birmingham, plain	7.00 to 8.00
Boston, chem.	10.00 to 10.50
Boston, dealers	6.50 to 6.75
Buffalo	11.50 to 12.00
Chicago	10.25 to 10.75
Cincinnati, deal.	9.25 to 9.75
Cleveland	11.25 to 11.50
Detroit	9.00 to 9.25
Eastern Pa.	11.00 to 11.50
Eastern Pa., chem.	14.50 to 15.00
New York, deal.	7.25 to 7.75
Pittsburgh	12.00 to 13.00
St. Louis	9.50 to 10.00

PIPE AND FLUES

Cincinnati, deal.	9.00 to 9.50

RAILROAD GRATE BARS

Buffalo	13.00 to 13.50
Chicago, net	13.00 to 13.50
Cincinnati	10.00 to 10.50
Eastern Pa.	12.50 to 13.00
New York, deal.	9.25 to 9.75
St. Louis	13.00 to 13.50

FORGE FLASHINGS

Boston, dealers	10.25 to 10.50
Buffalo	13.75 to 14.25
Chicago	10.50 to 11.00
Cleve. over 10 in.	14.00 to 14.50
Detroit	12.00 to 12.50
Pittsburgh (light)	15.00 to 15.50

FORGE SCRAP

Boston, dealers	9.00 to 9.50
Chicago	18.50 to 19.00
Eastern Pa.	14.00 to 14.50

AKCH BARS AND TRANSOMS

Chicago, net	21.50 to 22.00
St. Louis	22.50 to 23.00

Iron, Steel Works Scrap

AXLE TURNINGS

Boston, deal	6.75 to 7.00
Buffalo	14.50 to 15.00
Chicago	13.00 to 13.50
Cleveland	12.50 to 13.00
Eastern Pa.	15.00
Pittsburgh	16.50 to 17.50
St. Louis	12.00 to 12.50

STEEL CAR AXLES

Birmingham	17.00 to 18.00
Boston, ship point	17.00 to 17.50
Buffalo	19.50 to 20.00
Chicago	19.60 to 20.15
Eastern Pa.	22.75 to 23.00
Pittsburgh	21.50 to 22.00
St. Louis	21.00 to 21.50

SHAFTING

Boston, ship point	14.00 to 14.25
Chicago	17.35 to 17.90
Eastern Pa.	19.00 to 20.00
New York, deal.	15.00 to 15.50
St. Louis	18.50 to 19.00

Irop Foundry Scrap

CAR WHEELS

Birmingham, iron	11.00 to 12.00
Boston, iron	14.00 to 14.50
Buffalo, iron	14.00 to 14.50
Buffalo, steel	19.50 to 20.00
Chicago, iron	14.50 to 15.00
Chi., rolled steel	19.00 to 19.50
Cincinnati	12.50 to 13.00
Eastern Pa. cast.	16.50 to 17.00
Eastern Pa., rolled	19.00
N. Y., iron, deal.	12.50 to 13.00
Pittsburgh, iron	16.25 to 16.75
Pittsburgh, steel.	21.00 to 22.00
St. Louis, iron	15.00 to 15.50
St. Louis, steel	17.50 to 18.00

No. 1 CAST SCRAP

Birmingham, cup	13.00 to 14.00
Buffalo	16.25 to 16.75
Boston, textile	16.00 to 16.50
Chicago, mach.	17.90 to 18.50
Chicago, railroad	17.35 to 17.90
Chicago, agri.	16.25 to 16.80
Cincinnati, mach. cupolas, gross	19.50 to 20.00
Cleveland, cupola	16.50 to 17.00
Detroit, net	13.00 to 13.50
East. Pa., cupola	16.00 to 17.00
N. Y., cup., deal.	13.00 to 13.50
N. Y., del. local foundries	17.00 to 17.50
Pittsburgh, cupola	15.25 to 15.75
San. Fran., del.	13.50 to 14.00
Seattle	15.50 to 16.00
St. L. No. 1 mach.	15.50 to 16.00
St. Louis, No. 1	15.00 to 15.50
Valleys	16.50 to 17.00

HEAVY CAST

Boston	10.50 to 11.00
Buffalo, breakable	13.00 to 13.50
Cleve., breakable	12.50 to 12.75
Detroit, auto, net	15.00 to 16.00
Detroit, breakable	9.50 to 10.00
Eastern, Pa.	16.00
New York, deal	11.75 to 12.50
Pittsburgh	13.00 to 14.00

MALLEABLE

Boston, railroad	16.50 to 17.00
Buffalo	19.00 to 19.50
Chicago, agri.	16.00 to 16.50
Chicago, railroad	19.00 to 19.50
Cinn., R. R., deal.	15.50 to 16.00
Cinn., agri., deal.	14.25 to 14.75
Cleveland, rail	16.00 to 16.50
Detroit, auto	15.00 to 15.25
St. Louis, rail	16.50 to 17.00

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	14.00 to 15.00
Boston, dealers	12.50 to 13.00
Rails scrap, Boston	11.00 to 12.25
Skeleton, Boston	9.50 to 10.00
Buffalo	16.50 to 17.50
Chicago	17.50 to 18.00
Eastern Pa.	18.00 to 18.50
New York	14.00 to 14.50
Pittsburgh district	18.00 to 18.50
St. Louis	16.00 to 16.50

LOCOMOTIVE TIRES

Chicago, cut	19.00 to 19.50
St. Louis, No. 1	15.50 to 16.00

LOW PHOS. PUNCHINGS

Chicago	18.00 to 18.50
Pittsburgh	21.00 to 21.50

ers of scrap are out of the market and quiet prevails, in spite of heavy consumption. Some export buying is the only activity. Prices are firm, with only slight variations.

New York, April 23.—The scrap dealers' buying market is easy and unsettled. Notwithstanding a high rate of operations at eastern consuming plants, little mill buying of scrap is noted. Negotiations by two large eastern mills for No. 1 railroad steel still are pending. Following a 50-cent reduction by some dealers here on No. 2 melting steel for Pottsville, Pa., bringing the dealers' delivered price to that point down to $12, the New York base has been slightly revised to $8.25 to $9.50.

It was erroneously reported last week that one dealer advanced railroad steel for Bethlehem to $17. This should have been $16.

Buffalo, April 23.—Dealers are buying heavy melting steel, selected grade, at $17.25. There is good demand for No. 2 steel, with $14.75 offered by dealers. A boatload of heavy melting steel was due at Bethlehem from Detroit today or tomorrow. Tonnage buying of No. 1 is expected this week. Blast furnace scrap, machine shop turnings, stove plate and some other materials are off 25 cents a ton. Low phosphorus, short steel rails and rolled steel wheels are scarce and firm.

Philadelphia, April 23.—Grate bars and stove plates have been reduced 50 cents per ton. One mill still is paying $13 but another has obtained considerable tonnage at $12.50. Forge scrap still is selling at $14 to $14.50. No activity is reported in heavy melting steel, dealers still asking $18 but consumers have not paid this figure.

Pittsburgh, April 23.—Iron and steel scrap prices are tending downward. Several grades are off on recent sales; others are nominally lower on the basis of dealers' asking prices. Sales of heavy melting steel have been made at $18.50 and $18.75, a decline of 25 cents from previous transactions. Some mills are out of the market but continued heavy consumption indicates resumption of buying soon. Compressed sheets are steady, recent buying, holding to the same range as No. 1 heavy melting steel. No. 2 steel is quoted at $2 per ton less. Machine shop turnings are more active and are up 25 cents. Borings and turnings are quiet but unchanged.

Cleveland, April 23.—Although no holdups against scrap orders have been received and no embargoes placed, mills are rejecting much scrap. This is particularly true in the valleys. Large amounts of scrap are coming out and are being applied against orders.

Cincinnati, April 23.—Iron and steel scrap has shown some signs of dragging but prices are unchanged. Demand from the east helps sustain the market here. Heavy melting steel has declined 25 cents at the top of the spread, but the minimum continues at $13.50. Selling is in small lots.

St. Louis, April 23.—Railroads are marketing iron and steel scrap actively and in good quantity, and the market is decidedly firm. Aside from railroad contributions, little material is coming out, and what does appear goes quickly into consumption, leaving little for surplus or manufacture in the scrap yards.

Dealers meet unusually few rejections, which indicates melters are in need of material. Steel specialties and heavy melting continue popular and prices for everything in that class is strong. Rolling mill grades are also wanted, and there is a steady call for blast furnace scrap.

Detroit, April 23.—As a result of the largest buyer of auto cast withdrawing from the market, this grade appears to be sinking to the level of machinery cast, and is now quoted at $15 to $16.

Birmingham, Ala., April 23.—Deliveries of iron and steel scrap are fairly active but on business booked during the last 60 days. Heavy melting steel is held at $12.50 per ton for best quality, but general heavy steel is lower.

Toronto, Ont., April 23.—Iron and steel scrap sales fell off slightly during the week. No future delivery contracts have been closed recently and spot demand is less active. Supply has improved and dealers experience less difficulty in securing scrap. The recent advance in dealers buying prices has brought out some tonnages.

Canadian Scrap

Dealers' Buying Prices

MONTREAL
Per Gross Ton

Iron axles	$22.00
Steel axles	20.00
Car wheels	16.00
Stove plate	13.00
Wrought pipe	6.00
Turnings	6.50
Heavy melting steel	8.00

TORONTO

Steel axles	15.00
Iron axles	17.00
Heavy melting steel	9.50
Turnings	7.50
No. 1 mach. cast (net)	16.00
Malleable (net)	14.00

Semifinished Steel

Prices Advanced at Pittsburgh and Chicago—Material Scarce

SEMIFINISHED STEEL PRICES, PAGE 1144

Pittsburgh, April 23.—Higher prices have been announced on billets and sheet bars, although the market remains largely nominal due to the fact mills have no excess material and remain out of the market. Carnegie Steel Co. has raised billets $2 a ton and sheet bars $1 a ton, to $36 for both products. Scarcity in all semifinished material still is reflected in occasional restricted operations of finishing mills. Some producers have difficulty taking care of requirements of regular contractors. Wire rods are

Youngstown, O., April 23.—Shortages of billets, slabs and sheet bars continue to be reported by local consuming mills. Some important producers of these materials are paying premiums to others to round out supplies for subsidiary finishing mills. Billets and slabs bring $34, Pittsburgh and Youngstown, while sheet bars hold firmly to $35, same bases. Rods are $42, Pittsburgh and Cleveland.

Cleveland, April 23.—While some producers of sheet bars, billets and slabs in the Pittsburgh district are understood to have advanced their prices $1 a ton, Cleveland prices continue unchanged because of the fact the leading local producer has under contract all of its second quarter output on a basis of $35, Cleveland or Youngstown, for sheet bars, and $34 for billets and slabs. Nothing is available here in the open market, and quotations are nominal.

Chicago, April 23.—Rerolling or commercial billets, 4 x 4-inch base, are being quoted nominally at $37, Chicago, as little tonnage has been made available in the open market. The Chicago quotation has been advanced $2 with higher nominal quotations in the Pittsburgh district. The semifinished market is extremely tight.

Refractories

High Iron, Steel Output Forecasts Repair Work

REFRACTORIES PRICES, PAGE 1144

Pittsburgh, April 23.—Refractory demand holds to approximately the March rate, although current outlook is favorable. Steel mills have been operating furnaces close to capacity and repair work has been held in abeyance. Considerable relining work is expected to be done after the present peak in steelmaking is past.

Current refractory buying is confined largely to material for repair work, although a fair volume of new construction work is pending or in prospect. Youngstown Sheet & Tube Co. will require a large number of brick for work in the Chicago district. Davison Coke & Iron Co. has ordered an additional battery of 35 by-product coke ovens on Neville Island. Brick for the Brunot Island plant of the Duquesne Light Co. also is pending. No inquiries have been issued for prospective work for National Tube Co. at New Kensington, Pa., new blast furnace of Weirton Steel Co., Weirton, W. Va., or improvements at Homestead works of Carnegie Steel Co.

Scrap Dealer Elects

J. P. McCann has been elected president and D. L. Wilkoff vice president of the United Iron & Metal Co., Pittsburgh, scrap dealer.

The American Association of Engineers has moved its national headquarters from 63 East Adams street, Chicago, to the Eighth floor of the Willoughby Tower, Michigan boulevard at Madison street, the same city.

The Market Section

Bars

Pressure for Delivery Increases —Repairs Tend to Slacken Production—Prices Strong

CONSUMERS under the necessity of covering as far ahead as practicable have bought second quarter requirements and now are concentrating on deliveries. At Chicago mills find 12 to 14 weeks necessary to accommodate late orders. At Pittsburgh three to four weeks suffice. High operations over a long period have necessitated repairs that tend to reduce production.

BAR PRICES, PAGE 1143

Chicago, April 23.—With second quarter finished steel tonnage largely booked and third quarter contracting some weeks away, pressure from buyers for delivery is more accentuated than at any time since the first of the year. In addition, furnace and mill equipment, under the strain of capacity operations for months, must undergo occasional repair work, tending to reduce output. Thus April production may be slightly under March, despite order books that call for at least an equivalent volume. Deliveries now are extended 12 to 14 weeks on bars and plates, and one producer finds ingot tonnage for those products sold virtually through July. Spot sales are active, total new tonnage in the week just closed having reached the sixth in volume for this year. Specifications are above the average weekly rates of the past year. No appreciable lessening in automotive and parts makers' requirements of cold finished and forging steel is seen. Automotive, implement and tractor orders lead in bars.

While quotations on soft steel bars to miscellaneous buyers are 2.05c to 2.15c, Chicago, bar tonnages have just been closed on the basis of 2.20c on mixed carloads involving interplant switching. Alloy steel bar mills are operating in full. Tractor builders are taking more alloy and special steels, and are adding greater refinements.

Pittsburgh, April 23.—Producers of merchant steel bars gradually are working off backlogs as specifications are at a slower rate than a month ago when contracts were being closed out. It was not expected that new buying would maintain the rapid pace set during March and mills have been able to effect only a slight improvement on extended deliveries. Three to four weeks still are required on some sizes of bars. Although specifications are slower, total volume is regarded as satisfactory and demand is well diversified. Sellers report no difficulty in obtaining 1.95c, Pittsburgh, minimum on new business although applications of higher prices are few.

New York, April 23.—Steel bar sellers continue to advise their trade to place specifications well in advance of actual requirements. Some mills now ask instructions on tonnage to be shipped in June. Mills generally are scheduled four to six weeks ahead, although occasional lots can be included in current rollings. Consumption is well maintained at the heavy rate of recent weeks. The market continues firm at 1.95c to 2.05c, base, Pittsburgh, equivalent to 2.29c to 2.39c, delivered New York.

Cleveland, April 23.—Soft steel bar specifications of most makers have shrunk moderately. Automotive demand continues to lead, and pressure for deliveries against second quarter contracts continues marked. Local mills ask 1.95c, base, Cleveland, while outside mills quote 1.95c to 2.00c, delivered Cleveland.

Philadelphia, April 23.—Steel bar specifications thus far in April are materially less than in March. Consumption, however, has not receded proportionately. Bar prices continue 1.95c to 2.05c, base, Pittsburgh, and exceptions under this range are few.

New England Shows Gain

Worcester, Mass., April 23.—Valve and gear makers in New England have booked heavy volume, assuring capacity operations in most instances through this quarter. Makers of this equipment report business far in advance of last year, with demand well spread. Demand from the paper industry has been heavy and with development of the cruiser building program an additional large volume of valve business will be placed. There is a tendency toward the use of a wider range of alloys in the manufacture of both gears and valves.

Plates

Demand Still Active, and Market Firm—All Grades at Capacity in Chicago District Mills

PLATE specifications continue active. No moderation is noted in the tight delivery situation in the Middle West, while shipments are easier in the East. Chicago district mills are experiencing capacity demand simultaneously for narrow and wide, sheared and universal plates, for the first time in history, it is believed. Miscellaneous awards are fair. Prices are firm.

PLATE PRICES, PAGE 1143

Pittsburgh, April 23.—Plate business is expanding as the result of recent freight car and barge awards. Mill backlogs of plates are less extensive than in bars but a steady volume of new buying is replacing material shipped. Sellers report little difficulty in maintaining the 1.95c, base, Pittsburgh, on new business.

Chicago, April 23.—Pipe line work from Monroe, La., to Birmingham is expected to add tonnage to plate mills here. Several other pipe line projects are reported active in the South. No relief is seen in the tight plate delivery situation. Shipments are being extended well through July. Probably never before have producers experienced full capacity demand simultaneously for narrow and wide sheared and universal plates, such as now exists. Oil tank tonnage closed during the week amounted to 1800 tons, for a Pacific coast builder. Carbuilders' tonnage is moving in heavy volume. More pressure from buyers is exerted for deliveries than heretofore this year. The 2.05c to 2.15c, Chicago, quotation prevails, but much of plate tonnage now on mill books is from preferred industries.

New York, April 23.—Plate demand continues heavy, although the total appears slightly less than in recent weeks. Some eastern mills that were not promising shipments in less than four to six weeks now are able to ship sheared plates in three to four weeks and universals can be had within a week or two. Albany, N. Y., again will open bids on its projected pipe line April 24, and despite expectations bids will be taken only on cast iron pipe. Standard Oil Co. of New Jersey has placed 1000 tons of tank work for Paulsboro, N. J., with an unidentified fabricator. The market continues firm at 2.05c to 2.15c, base, Coatesville, and 1.95c to 2.05c, base, Pittsburgh, depending on which results in the lowest delivered price. Two producing units in the East are down for repairs.

Cleveland, April 23.—Local plate mills' specifications are sufficient to maintain a 75 per cent schedule, with deliveries in three to four weeks. Miscellaneous specifications are being received against this quarter's contracts at 1.95c, Pittsburgh. Pending tonnages include 2500 to 3000 tons for 500 tank cars for Union Tank Car Co., 1600 tons for a pipe line in Detroit and 600 to 700 tons for a water

line of 22 or 24-inch pipe for Chase Brass & Copper Co., Euclid, O.

CONTRACTS PLACED

2500 tons, by Pacific Car & Foundry Co., Seattle, to Pacific Coast Steel Co.
750 tons, by Pacific Car & Foundry Co., Seattle, to eastern producers.
600 tons, caissons for bridge at Carquinez Straits, for Southern Pacific Co., San Francisco, to Western Pipe & Steel Co.

CONTRACTS PENDING

3000 tons, for flat cars for Southern Pacific Equipment Co., San Francisco; bids in.
2500 to 3000 tons for 500 tank cars for Union Tank Car Co. Ohio fabricators figuring.
1600 tons, pipe line for Detroit. Ohio fabricators bidding.
600 to 700 tons, one mile of 22 or 24-inch welded pipe for water line, Chase Brass & Copper Co., Euclid, O. Bids being received.

Iron Ore

Consumption Far Ahead of 1928—Movement Is Active

IRON ORE PRICES, PAGE 1144

Cleveland, April 23.—Consumption of Lake Superior iron ore is running about 700,000 tons a month ahead of 1928, and while the shipping season starts, lively cargoes cannot be obtained promptly by some boats. This situation will be rectified soon. Some northern railroad schedules this year are 15 to 20 per cent over 1928, and private advices from Duluth say some operators anticipate shipments this year will total 63,000,000 to 64,000,000 tons. Sellers here estimate the movement will be at least 60,000,000 tons. The market is quiet, as most consumers have covered for the season. Ore at lower lake docks and at furnaces April 1 is reported by the Lake Superior Iron Ore association as 4,253,338 tons less than on April 1, 1928. Details of the report follow:

	Tons
Ore consumed in February	4,818,811
Ore consumed in March	5,465,015
Increase in March	646,204
Ore consumed in March, 1928	4,808,075
Ore at furnaces April 1, 1929	15,782,068
Ore on Lake Erie docks, April 1, 1929	4,223,348
Total at furnaces and Lake Erie docks, April 1, 1929	20,005,416
Total April 1, 1928	24,258,754

The large open pit mines on the Mesabi range are loading ore, and mining operations in other districts are picking up. At Pickands, Mather & Co.'s silicious iron ore pit, the Volunteer, Marquette range, 600,000 tons of ore was broken loose April 18 with a charge of 106 tons of dynamite, exceeding the mine's own previous records for heavy blasts.

Buffalo Near Capacity

Buffalo, April 23.—Operation of open-hearth furnaces in this district is practically at working capacity, with 33 of the 37 units in daily production. May schedules will be close to capacity if sales hold at present levels.

Pipe

Detroit Divides 14,000 Tons—To Buy 3340 More Tons—Orders Scarce at Chicago

DETROIT bought 5000 tons of cast pipe from French makers and 9000 tons from four American producers. It will take new bids on 3340 more tons April 30. New York voted additional money to bring appropriation up to cost of 12,000 tons. Milwaukee takes bids on 2786 tons of pipe and 93 tons of castings. Several sewage disposal lines are up. Prices are steady.

PIPE PRICES, PAGE 1144

New York, April 23.—Some cast pipe makers report a fair activity. Others assert business is the slowest for this season in many years. Several sewage disposal jobs have recently come out, but even in the aggregate it is believed this work will require relatively little cast pipe. One of the largest disposal jobs is the Rahway Valley trunk line at Westfield, N. J., on which general contractors' figures will be opened May 2. Another is scheduled for opening May 1 for Springfield, N. J. Cast pipe prices are easy. Not enough business is going to afford a real test.

Bids on approximately 12,000 tons of cast pipe for the local department of water supply, gas and electricity exceeded appropriations. Action was taken last Thursday by the city to provide the additional funds necessary and an award to the original bidder is expected this week.

Boston, April 23.—Pipe contracts were few the past week. Chelsea, Mass., will open bids April 26 on 200 tons of 6 to 12-inch pipe while Providence, R. I., opens bids April 29 on 250 tons of 12-inch. Cambridge, Mass., awarded 100 tons of 6-inch. Brookline, Fitchburg and Natick, Mass., let 450, 400 and 200 tons, respectively. Private business continues fair. Prices eased off slightly. For 4-inch, $47.60 prevailed, while for 6 to 12-inch, $43.10 to $44.10 was quoted and for 16 to 20-inch pipe, $42.10 to $43.10. The customary $3 per ton differential on class A and gas pipe still applies.

Pittsburgh, April 23.—A moderate expansion in demand for merchant pipe is noted in this market. Little change has taken place in connection with seamless material for the oil country, activity in restriction of oil drilling having no further depressing effect on demand for tubular products. Lapwelded orders continue scarce. Mechanical tubing and locomotive tubes, however, remain fairly active.

Chicago, April 23.—Important cast iron pipe projects are scarce in this and surrounding markets. Orders to the foundries consist largely of carload requirements for smaller subdivision work. Detroit waterworks board will readvertise for 3340 tons of the 6 and 16-inch pipe in its recent inquiry for 15,000 to 20,000 tons of cast and centrifugal pipe. The remainder of the tonnage, 14,000 tons, has been awarded, 5000 tons of which went to French sellers on the basis of $39.30, delivered. Carload prices in this district are reported steady on the basis of $45.20 to $46.20, delivered Chicago, or $37 to $38, base Birmingham.

CONTRACTS PLACED

14,000 tons, 24 and 36-inch pipe for Detroit: 1500 tons of 24-inch and 3500 tons of 36-inch cast pipe to French sellers, at $39.30, delivered; 1000 tons of 24-inch to American Cast Iron Pipe & Foundry Co., at $41; 1500 tons of 24-inch to James B. Clow & Sons, at $40.65; 2000 tons of 36-inch to Lynchburg Foundry Co., at $40.92; and 4500 tons of centrifugal pipe to R. D. Wood Co.
Year's supply of sewer pipe for Springfield, Mass., approximating $30,000 worth, to Cook Supply Co.
450 tons, 6, 8 and 10-inch for Brookline, Mass., to Warren Foundry & Pipe Co.
400 tons, 6 and 12-inch for Fitchburg, Mass., divided between Warren Foundry & Pipe Co. and United States Cast Iron Pipe & Foundry Co.
350 to 400 tons (estimated) 4 and 6-inch class C pipe for new waterworks system at Pewaukee, Waukesha county, Wis., to McWane Cast Iron Pipe Co., on its bid of $19,610.
200 tons, various sizes for Natick, Mass., to R. D. Wood & Co.
175 tons, cast iron pipe for Bear Gulch Water Co., Menlo Park, Calif., to Pacific States Cast Iron Pipe Co.
100 tons, 6-inch pipe, Cambridge, Mass., to R. D. Wood & Co.

CONTRACTS PENDING

38,000 meters, 4, 5 and 6-inch centrifugal pipe, with alternate bids to be accepted on seamless steel pipe, for the Philippine government, bids to be opened June 1.
3340 tons, 1140 tons of 16-inch and 2200 tons of 6-inch for Detroit; bids April 30.
2786 tons of 24 to 42-inch class C pipe and 93 tons of special castings for Milwaukee. Bids close April 30. Specifications follow: 28.5 tons of 24-inch, 792 tons 30-inch, 917 tons 36-inch, and 645 tons of 42-inch plain end pipe; 312.70 tons 30-inch, 30.45 tons 36-inch, and 31.25 tons 42-inch lugged pipe.
678 tons, 20-inch class B, Sewer system, Klamath, Falls, Oreg.; bids May 6.
250 tons, 12-inch pipe for Providence, R. I. Bids opened April 29.
200 tons, 6 to 12-inch pipe for Chelsea, Mass. Bids opened April 26.
136 tons, 6 and 8-inch class B, Alhambra, Calif.; bids April 23.
132 tons, 6-inch class B, improvement, Percy street, Yuba City, Calif.; bids May 6.
113 tons, 4 to 8-inch class B, Gilroy, Calif.; bids April 22.

Shape Shipments Gain

Washington, April 23.—Shipments of structural shapes in March, at

277,200 tons, increased over February, but fell slightly below January, as the following comparison by the department of commerce shows:

	——New Orders——			Shipments
	Actual tonnage	Per cent of capacity	Computed tonnage	computed tonnage
1928				
January	175,987	55	211,750	204,050
February	221,836	69	265,650	173,250
March	215,395	67	257,950	227,150
April	196,958	61	234,850	238,700
May	256,525	80	308,000	261,800
June	249,045	78	300,000	261,800
July	246,561	77	296,450	265,650
August	293,819	92	354,200	288,750
September	265,610	83	319,550	273,350
October	207,696	65	250,250	319,550
November	199,129	63	242,550	281,050
December	198,445	64	246,400	277,200
Total, 1928		71	3,287,600	3,072,300
1929				
January	205,659	69	246,400	273,350
February	213,042	70	269,500	238,700
March	292,426	93	358,050	277,200

Reports received from April to December, 1928, were from 201 to 241 firms with a capacity of 308,000 tons to 322,000 tons.

Tin Plate

Specifications Above Normal—Operations Increased Slightly

TIN PLATE PRICES, PAGE 1144

Pittsburgh, April 23.—Tin plate specifications are running ahead of the March rate and show more than the usual seasonal upturn. Some large consumers have specified first-half contracts fully and total business for the first half is expected to show a fair gain over last year. Tinning department at Farrell, Pa., works of American Sheet & Tin Plate Co. was damaged by fire April 19, interfering slightly with operations. Leading interest has increased production one point, and the average for the district holds around 97 per cent.

Carnegie Leads Valley with Increased Rate

Youngstown, O., April 23.—While independent steelmakers continue active at unchanged operating rates, Carnegie Steel Co. has speeded up to 85 to 90 per cent. Generally, operations here slightly exceed 90 per cent, or equal to the high operating ratio prevalent at the opening of the year.

Practically every open-hearth furnace is operating at above theoretical capacity, due to continued operation seven days a week among independents. Demand continues so strong as to accentuate the shortage of semifinished steel evident here for six weeks. Only three independent open-hearth units are down for urgent repairs, making 48 active this week out of 51, against 46 last week. Independent bar operations are at 75 per cent, but Carnegie Steel now is at 90 per cent. Bessemer operations also have been speeded up.

Philippine islands in January imported 655,000 kilograms of cast iron pipe, of which 641,000 kilos were from the United States.

Sheets

Market Is Firmer, with Demand Continuing in Large Volume—New Buying Declines Slightly

A STRONGER tone is noted in the sheet market, makers obtaining the new prices on a larger share of business, although black sheets are slightly easier at Detroit. Some large producers of automotive sheets are practically sold up to the last half of July. Lack of semifinished steel prevents Chicago mills from operating at 100 per cent. Deliveries are more deferred in East.

SHEET PRICES, PAGE 1143

Pittsburgh, April 23.—Demand for and production of sheets are well maintained. Specifications and new buying have declined slightly since April, but the comparison is with March, a most active period. Automotive industry, leading factor in sheet demand, gives no signs of sharply reducing its purchases and new orders for autobody material closely approach current shipments. Backlogs have not been reduced materially, and delivery is extended to six weeks. On other grades of material, shipment rarely can be made in less than four to five weeks. Farm implement manufacturers continue to take large tonnages, and a steady flow of business is received for freight cars. Mill operations continue close to capacity although scarcity of sheet bars still is a deterrent. Prices are showing a stronger tone. Producers are receiving full prices on most new business. Sellers report 3.70c, Pittsburgh, on galvanized is well maintained, although some reports are heard of 2.85c on black sheets at Detroit. Blue annealed generally is 2.20c, with tin mill black 3.00c and autobody 4.10c.

New York, April 23.—Blue annealed sheets have firmed up and 2.20c, base, Pittsburgh, now is the usual minimum. In some cases jobbing mills are quoting 2.30c. With some mills June delivery is the earliest that can be promised. Wide strip steel appears to be firm at 2.10c, base, Pittsburgh, on new business. Galvanized sheets are 3.70c, base, Pittsburgh, subject to the usual $2 differential to large jobbers.

Buffalo, April 23.—Automobile sheets are being sold for delivery in the last half of July. Some large producers are practically sold up to that date. The price for delivery next quarter is 4.365c, Buffalo. Black sheet business also is good, although there is smaller unfilled tonnage on hand. The price is 3.215c, Buffalo. Operation of mills is 90 per cent.

Philadelphia, April 23.—Consumption of sheets continues at an undiminished rate, the only adverse factor being that companies identified with the automotive industry are placing smaller tonnages for May and June shipment than they are now consuming. Blue annealed sheets are firmer at 2.20c, base, Pittsburgh. Galvanized show some uneasiness, ranging from 3.60c to 3.75c, base, Pittsburgh. Black appear to be 2.95c, but the price has not been tested.

Youngstown, O., April 23.—Steel barrel makers are re-entering the market for common sheets, and furniture makers continue to take important lots. No let-up appears in demand from the automotive industry. Leading mills refuse business that would likely extend into third quarter. Blue annealed sheets still are in heavy demand and the full price of 2.20c, Pittsburgh, is paid. Makers of galvanized sheets here are not interested in producing more than old customers demand, and they hold to 3.70c. However, reports from territory south of the Ohio river show that some mills are selling there at prices that figure back to 3.60c, Pittsburgh, and even at 3.50c. Autobody sheets are 4.10c, and black 2.95c.

Cleveland, April 23.—While some automotive customers are specifying less material than in March, all have large quantities of steel due them on older specifications and are anxious for delivery. Other consuming lines such as barrel makers, stove and furnace builders not only have material due them in the same way, but continue to furnish new specifications. Most mills offer six weeks delivery on blue annealed and black, seven on galvanized and eight on autobody. One 1500-ton blue annealed order was placed within the past few days for May shipment. Mill operations average 85 to 95 per cent. In black 2.95c, Youngstown, price which figures out to 2.85c, Pittsburgh, has appeared. For the most part, however, 2.95c, Pittsburgh, is firm. Concessions of $1 or $2 appear at times on galvanized.

Chicago, April 23.—Sheet mill operations are being held down to 85 per cent, despite order books that would warrant full operations, due to shortage in semifinished material. An independent sheet mill unit has its Milwaukee district mills operating in full this week, but is unable to maintain similar operations at Indiana Harbor. In general this producer is operating on a five-day week basis. Deliveries extend well into June on black, galvanized and blue annealed. Demand is well diversified. Prices are steady at 3.10c for No. 24 black, 3.85c for No. 24 galvanized, and 2.35c for No. 10 blue annealed.

St. Louis, April 23.—Specifications and new orders for sheets are in fair volume. Galvanized material is relatively slow. Prices are steady.

Structural Shapes

Deliveries Eight Weeks Deferred—Plain Material Prices Firm—Bidding Competitive —Much Work Now Under Consideration

EXTENSIVE specifications from car builders serve to enmesh western structural mills so that shape buyers have to wait sometimes eight weeks for deliveries. Plain material specifications continue active in most market sections and as a rule the 1.95c, Pittsburgh, price is firm, although bidding still is keenly competitive. Leading awards involve 7000 tons for an office building in New York, a 5200-ton hotel in that city and a 4700-ton building in St. Louis. Numerous pending items involve from 1000 tons up. They are topped by 8500 tons for a power house at Ashtabula, O. In excess of 35,000 tons of civic work is under consideration at Cleveland and much subway and road work in New York is up for early action during the next few weeks.

STRUCTURAL SHAPE PRICES, PAGE 1143

Chicago, April 23.—Building work is comparatively of minor importance in structural orders. Mill orders from carbuilders have reached the heaviest volume in five years or more, and this is adding to structural bookings and helping to extend deliveries to as much as eight weeks. About 8000 tons of fresh building work, however, has appeared. Shortages of semifinished material are interfering with smooth structural mill operations. Buyers have virtually exhausted what stock material they had been able to accumulate recently to safeguard deliveries. Plain material to miscellaneous buyers is 2.05c to 2.15c, Chicago.

New York, April 23.—Structural buying includes several large tonnages. The latest involves 5200 tons for a hotel. Mill operations continue high, and fabricating shops also are in a better position than in months. Fabricated material prices appear firm, with shapes unchanged at 2.195c to 2.245c, New York.

Boston, April 23.—Bridge work involving 900 tons of structural, was placed in this district. Several projects are pending and awards are looked for within a short time.

Pittsburgh, April 23.—Fabricators are more optimistic. Inquiry is developing in larger volume and a good tonnage remains to be closed. Some hesitancy is seen on the part of several buyers to place pending business and most awards still are small. Specifications for plain material are steady and show little change. Mill backlogs are not extensive but sufficient to maintain operations fairly high. The market is steady at 1.95c, Pittsburgh, for plain shapes.

Cleveland, April 23.—Many large projects of a civic nature still are deferred. They aggregate in excess of 35.000 tons and should be awarded later in the year. Cleveland Electric Illuminating Co. will take early action on a power house at Ashtabula, O., to take 8500 tons. Several small jobs have been let. including a pressed steel plant at Toledo, O., 600 tons, to Whitehead & Kales Co. The market on ordinary tonnages is firm at 1.95c, Pittsburgh.

Birmingham, Ala., April 23.—Steel fabricating shops here have business in hand and in sight to warrant active operation for at least 90 days. Ingalls Iron Works Co. Inc. is furnishing the steel for an addition to the Rome Stove & Range Co. at Rome, Ga. The Ingalls company is building an addition with modern equipment which will cost more than $50,000. Virginia Bridge & Iron Co. has several contracts, including an airplane hangar for Yucatan, Mexico, 200 tons and a hangar at Long island, near New York, 200 tons. The Virginia company plans the erection in the next year of a complete shop in Birmingham, to cost $2,000,000. This will replace its plant, erected during the war.

Philadelphia, April 23.—Although principal factors in the shape market are observing a range of 2.00c to 2.05c, base mill, other mills have quoted materially lower on new business in certain instances this past week. As yet it is too early to gage the effect this will have on the general market. Volume of shape business is slightly smaller than in recent weeks. Slowing down of structural lettings has caused some fabricators to catch up on their work and some prices recently named on fabricated work show a hunger for business.

Awards Compared

	Tons
Awards this week	33,185
Awards last week	52.366
Awards two weeks ago	80,331
Awards this week in 1928	30,409
Average weekly awards, March	49.265
Average weekly awards, 1928	39.082
Average weekly awards, 1929	41,707
Total awards to date, 1928	665.686
Total awards to date, 1929	709,016

CONTRACTS PLACED

7000 tons, office building, Greensberg & Malzman, Pine and Wall streets, New York, to Hay Foundry & Iron Works.

5200 tons, 38-story Barbizan Plaza hotel, Sixth avenue, Fifty-eighth to Fifty-ninth streets, New York, to Harris Structural Steel Co., Murgatroyed & Ogden, 285 Madison avenue, architects.

4700 tons, Plaza building, Twelfth and Olive streets, St. Louis, to Mississippi Valley Structural Steel Co.

3000 tons, office building, Forty-first street and Madison avenue, New York, to Hay Foundry & Iron Works. This award previously was noted as involving 4000 tons and as going to another fabricator.

2500 tons, material for Pacific Car & Foundry Co., Seattle, to Pacific Coast Steel Co.

1900 tons, South avenue bridge, Youngstown, O., to American Bridge Co. Reported last week as 1000 tons.

1370 tons, New York Central warehouse, Kingsbridge road, New York, to McClintic-Marshall Co.

1000 tons, Hunter college, Bronx, New York, to unnamed fabricator.

750 tons, material for Pacific Car & Foundry Co., Seattle, to eastern producers.

750 tons, extension to power house, Inland Steel Co., Indiana Harbor, Ind., to Wisconsin Bridge & Iron Co.

750 tons, department store, Hartford, Conn., to Levering & Garrigues Co.

750 ton, international bridge over St. Johns river at Fort Kent, Me., to Dominion Bridge Works.

700 tons, Gauley river bridge, Chesapeake & Ohio railroad, to Virginia Bridge & Iron Co.

600 tons, plant, City Auto Stamping Co., Toledo, O., to Whitehead & Kales Co.

600 tons, building, Du Pont Engineering Co., Old Hickory, Tenn., to Virginia Bridge & Iron Co.

500 tons, miscellaneous bridge repairs, Rock Island railroad, Chicago, to Fort Pitt Bridge Works.

444 tons, warehouse for Port commission, Oakland, Calif., to Pacific Coast Engineering Co.

400 tons, car repair shop, Chicago, Rock Island & Pacific railroad, El Reno, Okla., to Ingalls Iron Works Co., instead of Virginia Bridge & Iron Co., as previously reported.

400 tons, building, Federal Container Co., Philadelphia, to Belmont Iron Works.

400 tons, foundry, De Laval Separator Co., Poughkeepsie, N. Y., to Frank M. Weaver Co.

400 tons, building, Federal Container Co., Philadelphia, to Belmont Iron Works.

400 tons, caissons for Carquinez Straits bridge, San Francisco, to Western Pipe & Steel Co.

385 tons, school No. 19, Staten island, N. Y., to Bethlehem Fabricators Inc.

350 tons, municipal courthouse, Pennsylvania avenue, Brooklyn, N. Y.

315 tons, highway bridges, New York, to American Bridge Co.

300 tons, plant for Sylvania Products Co., Emporium, Pa., to Rust Engineering Co.

250 tons, telephone building, Yakima, Wash., to Poole & McGonigle.

245 tons, two highway bridges for the Indiana state highway commission, Indiana, to the Rochester Bridge Co.

240 tons, riding academy, Cleveland Union Stock Yards Co., West Sixty-fifth street, Cleveland, to Pittsburgh Bridge & Iron Works.

216 tons, United States post office, Springfield, Ill., to the Rochester Bridge Co.

200 tons, telephone building, Salem, Oreg., to Poole & McGonigle.

190 tons, addition to warehouse, Steel Sales Corp., Chicago, to Duffin Iron Co.

165 tons, building, Airport Development Corp., Camden, N. J., to Belmont Iron Works.

150 tons, crane runway, Rockwood Alabama Stone Co., Rockwood, Ala., to Ingalls Iron Works Co.

150 tons, apartment, Gough and Austin streets, San Francisco, to Golden Gate Iron Works.

150 tons, two bridges, Boston & Maine railroad at Lawrence, Mass., and Milton, N. H., to Boston Bridge Works, Inc.

140 tons, Christian Science church addition, Cambridge, Mass., to Boston Bridge Works Inc.
125 tons, three lighters for Eastern Steamship Co., to American Car & Foundry Co.
125 tons, plant, Keystone Aircraft Corp., Bristol, Pa., to Belmont Iron Works.
125 tons, girder spans, Rock Island railroad, Chicago, to American Bridge Co.
100 tons, Dawes memorial, New Brighton, Pa., to Guibert Steel Co.

CONTRACTS PENDING

8500 tons, power house, Ashtabula, O., for Cleveland Electric Illuminating Co., Cleveland. Bids being taken.
3000 tons, highway bridge near Sioux City, Iowa.
3000 tons, Garfinkle building, Washington. Bids to be opened on general contract April 25.
2200 tons, for flat cars for Southern Pacific Equipment Co., San Francisco; bids in.
1500 tons, bridge work for Wabash railroad at Danville, Ill.
1370 tons, West Garfield street bridge, Seattle; bids May 10.
1200 tons, hotel addition, Boston & Maine railroad, Boston.
1000 tons, building, West End avenue and Sixty-fifth street, New York.
1000 tons, power house, Pennsylvania Water & Power Co., along Susquehanna river.
1000 tons, building, Title Guaranty & Trust Co., East Forty-fifth street, New York.
1000 tons, addition, Marmon Motor Car Co., Indianapolis. General contract to H. K. Ferguson Co., Cleveland.
700 tons, electrification towers, Pennsylvania railroad, Philadelphia. Bethlehem Steel Co., low bidder.
700 tons, office building, Madison, Wis.
700 tons, bridges in New Brunswick, Me.
600 tons, Evanston hospital and nurses home, Evanston, Ill.
500 tons, building for A. O. Smith Corp., Milwaukee.
500 tons, office, White Plains, N. Y.
500 tons, four tanks, Lever Bros., Cambridge, Mass.
300 to 400 tons, building in Montreal, Que., for Goodyear Tire & Rubber Co., Akron, O.
300 tons, Superior avenue station, Nickel Plate railroad, Cleveland. Plans out for figures.
200 tons, locomotive shop, Cleveland Union Terminal Co., Cleveland. Bids in.
150 tons, factory, Avalon street, Los Angeles.
140 tons, building on Newbury street, Boston.
100 tons, Harvard gymnasium, Cambridge, Mass.
Unstated tonnage, 21 bridges and culverts for board of county commissioners, Princeton, Ind. Contracts awarded April 15 to C. C. Farmer and Klondyke Coal Co., Oakland City, Ind.; George Soller and McRoberts & Son, Princeton, Ind.; William H. Rupert, Haubstadt, Ind.; E. H. Byers & Son, Fred Wehmer and E. C. May, Fort Branch, Ind.
Unstated tonnage, George Washington apartments, 144 East Twenty-fourth street, New York; H. B. Herst, architect.

Newton Contracts Let

Youngstown, O., April 23.—Newton Steel Co. has awarded the first contract for excavation and concrete foundation work for its new sheet mills near Monroe, Mich. A contract for excavation and concrete foundation work, said to total $400,000, has been placed with Walbridge Aldinger, of Detroit. A fill of 600,000 cubic yards is involved.

J & L Earnings Large

Pittsburgh, April 23.—Consolidated income report of Jones & Laughlin Steel Corp. and subsidiaries for first quarter gives total earnings, after operating expenses, of $6,907,587, less reserve for depreciation and depletion of $1,495,610 and interest on bonds of $157,798, leaving net income of $5.254,179. After dividends of $1.747.914. a balance of $3 506.265 was carried to surplus. An extra dividend of 1 per cent was declared on the common stock.

Concrete Bars

Rerolled Prices Hit Chicago Market—Scattered Pending Jobs Take 100 to 1225 Tons

RAIL steel concrete bars bring about keenly competition conditions in Chicago. Cleveland market is weak through concessions offered by some mills. Higher levels appear to be holding in Pittsburgh, Buffalo and elsewhere. A garage at Baltimore takes 600 tons. Several other structures take 100 to 500 tons apiece. A 1225-ton bridge is up at Seattle.

REINFORCING BAR PRICES, PAGE 1143

New York, April 23.—While a large tonnage of concrete reinforcing bars in the aggregate is pending here, actual awards are being postponed. The recent advance of $1 a ton is being well maintained. On mill shipments current prices are 2.05c, base, Pittsburgh, on mill lengths and 2.30c, base, Pittsburgh, on bars cut to length. The advance has been extended to warehouse prices, which now range from 2.90c to 3.30c, base, delivered in this territory, the price being dependent on size of order.

Buffalo, April 23.—Small lots of reinforcing bars are being sold at the new price of 2.90c, Buffalo warehouses. No large tonnages have been placed to test the new mill shipment price of 2.665c, Buffalo, but tonnage long pending must be covered soon and should fix the current base for larger lots. New inquiry this week includes three lots of 100 tons each of mesh for road projects.

Pittsburgh, April 23.—Concrete reinforcing bar sellers are kept busy figuring on new projects and a good volume of business is pending. Awards, although fairly numerous, are not large individually and lots of 50 tons or less predominate. The market gradually is firming up to the new 2.30c, Pittsburgh, price for cut lengths and 2.05c for stock lengths, advances of $1 a ton, respectively, over first quarter.

Chicago, April 23.—Quotations for both rail and billet steel reinforcing bars are unsteady, due largely to competition between the two classes of products. Rail steel prices, on the basis of recent bids, have gone below 2.00c. Small awards are more conspicuous than the larger projects. Billet bar fabricators virtually are specifying fully against second quarter contracts. More than 1000 tons are pending for school building projects in Chicago, held up by shortage of funds.

Awards Compared

	Tons
Awards this week	**4,990**
Awards last week	**6,375**
Awards two weeks ago	**7,365**
Awards this week in 1928	**10.590**
Average weekly awards, March	**6,832**
Average weekly awards, 1928	**6.189**
Average weekly awards, 1929	**6,364**
Total awards to date, 1928	**128.386**
Total awards to date, 1929	**108,183**

CONTRACTS PLACED

600 tons, ramp garage, Hutzler Bros., Baltimore, to Dietrich Bros.
500 tons, addition to stadium, University of Illinois, Champaign, Ill., to Olney J. Dean & Co.
470 tons, Jackson Tower building, Jackson, Miss., to Laclede Steel Co.
400 tons, parcel post station, Baltimore, to Truscon Steel Co., through Consolidated Engineering Co.
400 tons, warehouse, Fourth street, Oakland, Calif., to Pacific Coast Steel Co.
300 tons, apartment house, La Salle and Division streets, Chicago, to Inland Steel Co.
250 tons, building, American Bank Insurance Co., Ohio and Cass streets, Chicago, to Jones & Laughlin Steel Corp.
210 tons, museum, Golden Gate park, San Francisco, to Pacific Coast Steel Co.
200 tons, work for Westchester county, New York, to Kalman Steel Co.
175 tons, office building, North Oak street, Pasadena, Calif., to unstated company.
170 tons, building, Oak Leaves Printing Co., Oak Park, Ill., to unstated fabricator.
150 tons, theater, Green Bay, Wis., to American System of Reinforcing.
130 tons, Eckhart laboratory hall, University of Chicago, Chicago, to Calumet Steel Co.
125 tons, building, National Automotive Service, Seattle, to Northwest Steel Rolling Mills.
110 tons, stadium, Rock Island, Ill., to Concrete Steel Co.
100 tons, Planetarium, Grant park, Chicago, to American System of Reinforcing.
100 tons, building for Master Craftsman Inc., Flushing, N. Y., to McClintic-Marshall Co.
100 tons, medical and dental building, Wenatchee, Wash., to Northwest Steel Rolling Mills.
100 tons, boat house, Naval academy, Annapolis, Md., to unstated seller.
100 tons. miscellaneous work, including garage, East Thirteenth street, Cleveland, to Bourne-Fuller Co.
100 tons, building, Widlar Co., Cleveland, to Paterson-Leitch Co.
100 tons, building, Western Electric Co., Chicago, to Concrete Steel Co.
100 tons, medical arts building, Oak Park, Ill., to Concrete Engineering Co.

CONTRACTS PENDING

1225 tons, West Garfield street bridge, Seattle; bids May 10.
1000 tons, warehouse, Morton Salt Co., Chicago. Bids April 26.
600 tons, roadwork in Somerset and Cumberland counties, N. J.
450 tons, Plaza building, Twelfth and Olive streets, St. Louis.
400 tons, highway bridge, Wisconsin.
400 tons, hospital, Easton, Pa.
300 tons, East Ninth street bridge, Cleveland, Cleveland Union Terminal Co.
271 tons, viaduct, West Spokane street, Seattle; bids May 3.
200 tons, building, Edward Katzinger & Co.,

Baltimore. General contract to M. A. Long Co.
150 tons, building, Liquid Carbonic Co., St. Louis.
150 tons, Montecito county water district, Montecito, Calif.; bids in.
119 tons, garage, Monterey, Calif.; bids in.
115 tons, (mesh), Hinman road, Niagara county, N. Y.; Wilson and Shardon, Lockport, N. Y., low bidder.
110 tons, printing plant, Minna street, San Francisco; bids in.
105 tons (mesh) Upper Mountain road, Niagara county, N. Y.; W. W. Whitmore, Lockport, N. Y., low bidder.
100 tons, (mesh), North Canal road, Niagara county, N. Y.; W. W. Whitmore, Lockport, N. Y., low bidder.
100 tons, bridge, West 117th street and Berea road, Cleveland, New York Central railroad. Bids. in.

Steel Founders' Society Elects New Director

Granville P. Rogers, for three years secretary of the Artistic Lighting Equipment association, New York, has been appointed director of the Steel Founders' Society of America, Pittsburgh.

Mr. Rogers for many years was general sales and advertising manager of the Pyrene Mfg. Co., Newark, N. J., and later was sales manager of the general automotive equipment department of Johns-Manville Inc., New York. In addition he was in charge of merchandising and advertising for several large corporations covering widely diversified lines, and for long had been active in trade association work.

Iron, Steel Capacities Revised Upward

New York, April 23.—Steel ingot capacity of the country as of last Dec. 31 was 61,759,466 gross tons, according to the American Iron and Steel institute's annual survey. This compares with 58,627,910 tons as of Dec. 31, 1927. The country's steel castings capacity is 12,924,923 tons.

The institute established annual capacities as of Dec. 31 last on pig iron of 50,531,665 gross tons and of ferroalloys of 702,230 tons. The latter capacity refers to blast furnaces only, giving a total of 51,233,895 tons. The corresponding capacities as of Dec. 31, 1927, were 49,808,320 tons of pig iron and 724,030 tons of ferroalloys, making a grand total of 50,532,350.

Wood Asks Listed Stock

Alan Wood Steel Co. has made application to list 72,000 shares of 7 per cent cumulative nonvoting preferred stock of $100 per value on the Pittsburgh stock exchange. Control of this company, which is a reorganization of the Alan Wood Iron & Steel Co., is held by the Koppers Co. Preferred stock of the Koppers Gas & Coke Co., a subsidiary of the Koppers Co., recently was listed on the Pittsburgh exchange.

Iron Workers Ask Raise

St. Louis, April 23.—Union iron workers, now receiving $1.50 per hour, are asking $1.75 per hour beginning May 1. Representatives of 14 local steel fabricators oppose the demand.

Rails, Cars

Secondary Rails Increase—Canadian Road Buys 1000 More Cars—Two Roads to Award 5500

SECONDARY rail tonnages are increasing in the West, where 10,000 tons have been placed on mill order books. Despite additional car awards topped by 1000 more for Canadian National and possibility of Baltimore & Ohio placing 3000 and Chicago & North Western 2500 soon, April probably will fall below March. Two builders share 30 locomotive orders, five being for export.

RAILROAD TRACK PRICES, PAGE 1144

Chicago, April 23.—Orders for secondary rails are becoming much more active. Over 10,000 tons has just been placed on mill books, including 6000 tons for Great Northern and over 3000 tons in option from Nickel Plate. From 2000 to 3000 tons of secondary rail tonnage is on inquiry in small individual lots. Rail mill operations are at capacity, varying, however, with the amount of semifinished steel available.

Track fastenings sales totaled about 3000 tons during the week. All departments engaged are at capacity.

Carbuilding specifications are believed to be at their peak, but much tonnage of later car awards remains to be forwarded to the mills. An order for 2500 box cars is expected soon from Chicago & North Western.

New York, April 23.—The largest active car inquiry 3000 cars previously noted, is for Baltimore & Ohio. April probably will not be as good as March, when over 12,000 cars were placed by domestic railroads.

Pittsburgh, April 23.—Steady specifications are noted by producers of track fastenings. The extra for copper-content tie plates and spikes has been advanced from $2 a net ton to $3.

CAR ORDERS PLACED

Canadian National, 1000 40-ton automobile cars to Pullman Car & Mfg. Corp. These are in addition to 1000 automobile cars placed with the Pressed Steel Car Co. as reported in last week's issue.
Chesapeake & Ohio, 557 gondola bodies to Richmond Car Works and three mail-express cars to Pullman Car & Mfg. Corp.
Denver & Salt Lake, one baggage and mail and one baggage car, to American Car & Foundry Co.
Hocking Valley, three steel express and mail cars, to Pullman Car & Mfg. Corp.
Pacific Fruit Express, 600 steel underframes, to the Pacific Car & Foundry Co.
Piedmont & Northern Railway Co., 100 box car underframes with superstructures, to Richmond Car Works.
Southern Pacific, 13 coaches, to Pullman Car & Mfg. Corp.

LOCOMOTIVE ORDERS PLACED

Chicago, Rock Island & Pacific, five locomotives, to American Locomotive Co.; these are in addition to 25 reported placed with this same builder in a recent issue.
Denver & Rio Grande Western, four locomotives, to Baldwin Locomotive Works.
Sorocabana Railway, Sao Paulo, Brazil, five locomotives, to American Locomotive Co.
Southern Pacific, 16 locomotives, to Baldwin Locomotive Works.

CAR ORDERS PENDING

Baltimore & Ohio, 100 caboose underframes.
Manila Railway, 20 third class 65-foot passenger coaches.
New York, Chicago & St. Louis, 19 miscellaneous coaches.
New York municipal subway lines, 300 coaches. Inquiry expected to be issued within two months; final hearing relative to specifications scheduled for April 30.

Otis Steel Adopts New Improvement Plan

Net earnings of the Otis Steel Co., Cleveland, for the first quarter were $962,331 after all charges including bond interest, prior preference stock dividend, depreciation and estimated federal taxes. The net for the quarter was equivalent to $1.19 a share of common stock compared with 78 cents a share for the first quarter of 1928.

A small program involving approximately $300,000 is underway for betterments which, among other things, will provide for an increase in production of full finished sheets from 9000 to 10,000 tons monthly, an enlargement of the sheet warehouse, installation of two new cold-rolled mills and widening of two other mills to roll up to 63 inch-wide sheets.

Pittsburgh Stays at 95

Pittsburgh, April 23.—Open hearth and bessemer steelmaking in the Pittsburgh district is holding to its previous rate of around 95 per cent. Scarcity of semifinished steel is pushing furnace operations and there is some question whether recent rates can be continued in view of the tax on facilities. Operations of finishing mills generally are unchanged, except for a slight upturn in tin plate.

Chicago Drops to 95

Chicago, April 23.—Increasing repair work on open-hearth furnaces has been made necessary by the steady capacity operations since early in the first quarter. Operations have been disturbed slightly by necessary repairs, output being rated at 95 per cent or virtual capacity.

The Market Section

Wire

Agricultural Areas Aid Market as Season Advances—Jobbers Find Demand Is Increasing

ADVANCE in the season is causing better demand for wire and nails from agricultural districts and jobbers are feeling the draft from their stocks. Manufacturers also are taking a steady large tonnage. Fencing materials are increasingly in demand Automotive demand shows a slight lessening. Prices are steady and show no signs of weakness.

WIRE PRICES, PAGE 1144

Chicago, April 23.—Fair gains are being shown in orders for woven fencing, barbed wire and wire nails from most agricultural districts. Demand for manufacturers' and merchants' wire continues strong. April tonnage is heavier than expected. Jobbers in North Central states are encouraged over the spring outlook. Quotations to large jobbers for wire products are reported steady on the basis of 2.55c, Chicago or western mills, for bright plain wire, and $2.70 for wire nails.

Pittsburgh, April 23.—Demand for fencing material and wire nails, although still reflecting the heavy buying during the latter part of last year and adverse weather conditions in some sections of the country, gradually is expanding. Business in these products for some manufacturers is lagging decidedly below a year ago. Manufacturers' wire still is the most active product, and its movement to automotive industry is in good volume although slightly less than a month ago. The market on all products is steady, with plain wire 2.50c to 2.60c, Pittsburgh, and wire nails $2.65 to $2.75.

Worcester, Mass., April 23.—Diversity in demand features the wire market, at steady prices. Shipments continue heavy as specifications against second quarter contracts are good. Prices are firm on a basis of 2.75c, Worcester base, for plain wire to dealers.

Cleveland, April 23.—Wire mill operations are on a broader scale here as well as in the Youngstown district. Whereas for six months previously workmen have been laid off, today they are being re-employed. Trade has picked up especially in demand for nails, which have been in the trade doldrums for over six months. Jobbers especially appear interested in nails, their stocks having become depleted since Jan. 1 when they covered expected needs.

Cold Finished Steel

Specifications Are Active and Backlogs Continue Heavy

COLD FINISHED PRICES, PAGE 1144

Pittsburgh, April 23.—Effect of heavy tonnage placed late in first quarter in closing out contracts gradually are disappearing and more specifications are being received against higher priced second quarter contracts. Shipments are running slightly ahead of the February rate. Although buying by automotive interests has not been large this month, material is moving steadily to this industry and no cancellations or reductions in tonnage already placed are noted. Business now on books will run most producers well through second quarter. Cold finished steel bars are firm at 2.30c, Pittsburgh.

Tutein Case Nears End

New York, April 23.—The board of arbitration in the case of E. Arthur Tutein Inc. against the Hudson Valley Coke & Products Corp., alleging breach of pig iron and coke selling contracts, completed its hearings April 20. Both sides have to May 13 to submit briefs. The case then will be in the hands of the arbitration board for an award, which will be final and binding upon both parties.

Birmingham Rate 80-85

Birmingham, Ala., April 23.—Steelworks operation in the Birmingham district continue at 80 to 85 per cent. Considerable wire fencing and other light steel products are being exported, with Brazil a good buyer in this market. Prospects for business the remainder of the year are considered good.

Texas Nail & Wire Mfg. Co., Galveston, Tex., has been granted a drawback on nails and wire made from imported wire rods.

Strip

Delivery Continues Delayed but Specifications Have Slackened—Some Sizes Available in June

USERS of steel strip are not specifying as heavily as in March but producers are unable to make headway in reducing backlogs. Seven weeks is a fair average of delivery possibilities. On some sizes June is the best promise for shipment. Automotive demand has slackened somewhat. Prices are holding firmly and operations continue at mill capacity.

STRIP PRICES, PAGE 1144

Pittsburgh, April 23.—Although specifications against second quarter contracts are markedly below the March rate, producers of hot and cold-rolled strip steel have improved only slightly on extended deliveries in effect for many weeks. Late June delivery still is being offered on some sizes of hot-rolled strip and on few sizes are producers able to effect shipment in less than four to five weeks. Capacity operations continue the rule. The market continues firm at 1.90c and 2.00c, Pittsburgh, for two sizes of hot strip, and 2.75c to 2.85c for cold.

New York, April 23.—Some strip sellers report the situation in this product is tighter than before, and productions schedules in some cases are filled up further ahead. With some mills, shipments cannot be promised, as a rule, in less than seven weeks. Some makers have been forced to allocate tonnage, and have been declining tonnage except from regular customers.

Philadelphia, April 23.—Several strip buyers who so far have met requirements from shipments against first quarter contracts are trying to obtain an extension of first quarter terms, but indications are that mills are holding firmly to the new levels. The latter continue well scheduled ahead. Some schedules on narrow widths extend into July.

Cleveland, April 23.—Recessions in strip steel specifications from automotive customers so far have been slight. These are mostly because some large users over-specified in March to assure adequate supply. For the most part, however, shipments are as heavy as in March and in some cases heavier. Prices are 2.75c to 2.85c, Cleveland-Pittsburgh, on cold and 1.90c to 2.00c, Pittsburgh on hot, with $2 per ton additional procurable on less than five tons of a size. One order for hot strip placed here involved 300 tons.

Chicago, April 23.—Cold-rolled strip mills have backlogs of six to seven weeks. Second quarter buying is well out of the way. Specifications from automotive builders are holding moderately well. The market here is quoted at 2.75c to 2.85c, Pittsburgh-Cleveland base, for minimum lots of three tons and over.

Nonferrous Metals

Sales of Copper More Active at Unchanged Prices—Tin Quotations Fluctuate and Fall to Low Levels—Buying of Zinc Light

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead New York	Lead East St. Louis	Zinc St. Louis	98-99% Aluminum	Spot Antimony	Ingot Nickel
April 17	18.00	18.07½	17.62½	45.50	45.25	7.00	6.85	6.62½	23.90	9.50	35.00
April 18	18.00	18.07½	17.62½	45.25	45.50	7.00	6.85	6.62½	23.90	9.50	35.00
April 19	18.00	18.07½	17.62½	44.37½	44.37½	7.00	6.85	6.55	23.90	9.50	35.00
April 22	18.00	18.07½	17.62½	44.50	44.50	7.00	6.85	6.55	23.90	9.40	35.00
April 23	18.00	18.07½	17.62½	45.00	45.00	7.00	6.85	6.55	23.90	9.50	35.00

NEW YORK, April 23.—Copper was a little more active in the past week. The price has remained at the 18-cent level since the close of business April 15. Other nonferrous metals have shown small price change in a quiet market except for wild fluctuations in tin and new low prices. Business in tin has remained small.

Brass and copper mill products quotations were re-established after a period of having been withdrawn. They now are on a basis of 18 cents for copper. Shipments of products are extremely large and mills are well booked on output for May and June, but new specifications now are not coming as rapidly as they did recently.

Copper—The business at the 18-cent level has been done almost entirely by custom smelters. Other producers have participated only in a most limited way, as they still are well sold. Most of the latter continue out of the market entirely. Export sales have been relatively quiet, but a fair amount of buying remains to be done for shipment in May and June. The trend of prices will depend largely on how soon this buying is done. Domestic buying in the past week has been for all positions from April to August. It is believed that very little buying remains to be done for shipment prior to July

Zinc—Buying of prime western has been almost negligible the past week with a result that a very small tonnage of metal pressed on the market has sent prices down to a current range of 6.50c to 6.60c, East St. Louis. Some smelters are holding for 6.80c, which means that they are well booked and out of the market for the time being. Users appear to be covered on needs for this month and next, and have done much of their buying for June shipment, as well as some for July. Producers are very well booked through May, and some of them beyond.

Tin—The price of Straits fell from 45.62½c a week ago to 43.62½c on Saturday. It then recovered but again became weak and uncertain. For a number of months the market has had artificial support from powerful producing and speculative interests in London. Even with such support prices here barely held their own, so that in the past few weeks without such support they broke rapidly. Consumption is unusually large but output continues to exceed it. The market is approaching the season when consumption usually tapers off but there is no sign that output will be cut. Since the beginning of the year prices have fallen from 50 cents, and in the past few days have been down to prewar levels.

Lead—The market has held relatively well in the past week with a moderate amount of buying, mostly for May shipment. Lead has appeared to be a little more firmer than other metals. Some buying remains to be done for May requirements.

Aluminum—Shipments continue unusually large and sellers are well booked ahead. Prices are very firm and unchanged.—*Daily Metal Trade.*

Mill Products

Base price cents per pound f.o.b. mill, except where otherwise specified

SHEETS	
Yellow brass (high)	23.25
Copper, hot rolled	27.75
Lead, full sheets (cut ¼c more)	10.00
Zinc sheet (100-pound base)	$10.25
Zinc strip (100-pound base)	$9.25
Aluminum, flat sheets, up to 10 gage, 3 to 72 inches wide	31.30
SEAMLESS TUBE	
Yellow brass (high)	28.25
Copper	29.25
RODS	
Yellow brass (high, full turnings)	21.25
Naval brass	24.00
WIRE	
Copper	19.87½
Yellow brass (high)	23.75

Old Metals

Dealers' buying prices, cents per pound

HEAVY RED BRASS	
New York	12.00 to 12.50
Chicago	11.50-nominal
Cleveland	11.00 to 11.50
HEAVY YELLOW BRASS	
Cleveland	8.00 to 8.50
ZINC	
New York	3.50 to 3.75
Cleveland	3.25 to 3.50
HEAVY COPPER AND WIRE	
New York	14.00 to 14.50
Boston	13.50 to 14.00
Chicago	12.50-nominal
Cleveland	14.00 to 14.25
RED BRASS BORINGS	
New York	11.00 to 11.50
YELLOW BRASS TUBING	
Cleveland	8.00 to 8.50
LIGHT COPPER	
New York	12.50 to 13.00
Chicago	11.50-nominal
Cleveland	12.00 to 12.50
LIGHT BRASS	
Boston	8.00 to 8.50
Chicago	7.50-nominal
Cleveland	7.00 to 7.25
ALUMINUM	
Clippings, Cleveland	18.00 to 18.50
Borings, Cleveland	9.50 to 10.00
Cast, Cleveland	12.75 to 13.00
Cast, Boston	10.50 to 11.00

Secondary Metals

Remelt aluminum No. 12	17.00 to 17.50
Brass ingot, 85-5-5-5	16.25 to 16.50

Coke By-Products

Prices Steady, With Seasonal Requirements Almost Specified Out

New York, April 23.—Steadiness again characterizes the light oil distillates market, both with regard to prices and demand. The drug trade continues to round out its seasonal requirements of naphthalene, with prices firm.

Seasonal demand for sulphate of ammonia is nearing an end, with little likelihood of much important buying before June or possibly July, at which time fertilizer manufacturers probably will place their long-time contracts. The market, meanwhile, is steady at $2.30, delivered, for material for domestic account, and $2.20, port, in bags, for export.

Coke Oven By-Products

Per Gallon at Producers' Plant in Tank Lots

	Spot
Pure Benzol	$0.23
90 per cent benzol	0.23
Toluol	0.40
Solvent naphtha	0.30
Commercial xylol	0.30
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.17
Per Pound at Producers' Plants	
Naphthalene flakes	0.05½ to 0.06½
Naphthalene balls	0.06½ to 0.07½
Per 100 Pounds Delivered	
Sulphate of ammonia	$2.30

Mercury $123.50 to $124

New York, April 23.—Quicksilver is quiet at $123.50 to $124 a flask. Some sellers call futures $123, but others make no distinction.

Warehouse

Sales Large for Building and General Manufacturing Purposes—Quarter Destined to Establish New High Record—Prices Firm

STEEL for building and general manufacturing purposes is in good demand from warehouses. In most sections the aggregate movement for the month promises to exceed March. Buffalo jobbers expect sales for the quarter will exceed any 3-month period of 1928. Prices are unchanged, and except for occasional slight weakness in sheets, show strength.

New York—Jobbing demand here has increased materially in the past week or 10 days. This reflects particularly soldup conditions at many mills. Structurals are most active.

Pittsburgh—Sales are well maintained with slight increases noted for some materials. Sheets are more active and the soldup condition of mills is accruing to benefit of jobbers when quick delivery is required. Sheet prices generally are steady, although all sellers as yet have not gone to the higher prices named by a few interests a short time ago.

Buffalo—April sales of iron and steel at Buffalo promise to be the largest of any month in two years. Demand for all lines is good, with sheets and shapes as leaders. Warehouse operators look for the present quarter to surpass any of 1928.

Cleveland—Steel for building and various manufacturing purposes still is in good demand. In sheet metal, the demand appears even better than in March. Some grades of sheets, particularly black and galvanized show slight price weakness.

Cincinnati—Warehouse business increased in this market last week. Jobbers indicate that if this month continues at the present rate, it will be better than last.

Detroit—Quantity differentials on cold finished steel bars for less than 500 pounds are being established. On less than 100 pounds the differential is $1, from 100 to 299 pounds it is 75 cents, and from 300 to 499 pounds it is 50 cents.

St. Louis—Distribution of iron and steel from warehouse continues the gradual improvement of the past several weeks. The call for building materials is gaing daily.

Baltimore—Jobbers have advanced prices $3 per ton on bars, plates, shapes, hoops and bands, blue annealed sheets, cold finished rounds, flats, squares and hexagons.

Philadelphia—Warehouse bookings here are smaller than in March but are fully equal to last April. Some talk is heard about price advances but no action has been taken. Competition of foreign steel here is less serious than at first thought.

Warehouse Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.00c
Ft. Worth	3.75c
Houston	3.00c
Los Angeles	3.30c
New York†††‡	3.25c
Philadelphia*	2.80c
Pittsburgh	2.90c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.15c
St. Paul	3.25c
Tulsa	3.75c to 4.04c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Detroit	3.00c
Ft. Worth	3.75c
New York††	2.80c to 3.24c
Philadelphia*	2.80c
St. Louis	3.15c
Tulsa	3.75c to 4.04c

REINFORCING BARS

Baltimore	3.10c
Boston	3.265c to 3.50c
Buffalo	2.90c
Cincinnati	3.15c
Cleveland	2.25c to 2.44c
Detroit	2.30 to 3.00c
Ft. Worth	3.50c
Houston	3.00c
Los Angeles cl.	2.65c
Los Angeles lcl.	3.00c
New York	2.90c to 3.30c
Philadelphia	2.75c to 3.10c
Pittsburgh	2.90c to 3.175c
San Francisco cl.	2.00c
San Francisco lcl.	2.25c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.75c to 4.00c
Youngstown	2.30c to 2.60c

STRUCTURAL SHAPES

Baltimore	3.25c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland	3.00c
Detroit	3.10c
Ft. Worth	4.00c
Houston	3.25c
Los Angeles	3.30c
New York†††‡	3.25c to 3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

PLATES

Baltimore	3.25c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland, ¼-in. and thicker	3.00c
Cleve., 3/16-in.	3.20c
Detroit	3.10c
Detroit, 3/16-in.	3.30c
Ft. Worth	4.00c
Houston	3.00c
Los Angeles	3.30c
New York‡‡	3.30c
Philadelphia*	2.70c
Phila., 3/16-in.*	2.90c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

NO. 10 BLUE ANNEALED

Baltimore	3.60c
Boston 3/16-in.	3.915c
Buffalo	3.50c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.25c
Detroit	3.35c
Ft. Worth	4.50c
Houston	3.90c
Los Angeles	4.00c
New York‡‡	3.90c
Portland	3.75c
Philadelphia*†	3.25c
Pittsburgh**	3.35c to 3.45c
San Francisco	3.80c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.75c
Tulsa	4.20c to 4.34c

NO. 24 BLACK SHEETS

Baltimore	3.50c to 4.00c
Boston	4.85c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	3.90c
Cleveland	3.60c to 3.70c
Detroit	3.95c
Ft. Worth	4.70c
Los Angeles	4.90c
New York	3.90c to 4.00c
Philadelphia*†	4.10c
Pittsburgh**	3.85c
Portland	4.90c
San Francisco	4.90c
Seattle	5.00c
St. Louis	4.25c
St. Paul	3.95c
Tulsa	4.34c

NO. 24 GALVANIZED SHEETS

Baltimore	4.30c to 4.50c
Boston	5.60c
Buffalo	4.70c to 4.85c
Chicago	4.65c
Cincinnati	4.75c
Cleveland	4.35c to 4.55c
Detroit	4.75c
Ft. Worth	5.50c
Houston	5.30c
Los Angeles	5.30c
New York	4.75c
Philadelphia*†	4.85c
Pittsburgh**	4.85c to 4.95c
Portland	5.50c
San Francisco	5.30c
Seattle	5.50c
St. Louis	5.10c
St. Paul	4.90c
Tulsa	5.10c to 5.35c

BANDS

Baltimore	4.00c
Boston	4.015c to 5.00c
Buffalo	3.65c
Chicago	3.20c
Cincinnati	3.50c
Cleveland	3.25c to 3.65c
Detroit, 3/16-in. and lighter	3.30c
Ft. Worth	4.25c
Houston	3.65c
Los Angeles	4.15c
New York‡‡	3.75c
Philadelphia*	3.15c
Pittsburgh	3.25c
Portland	4.00c
San Francisco	3.75c
Seattle	4.00c
St. Paul	3.50c
Tulsa	4.50c to 4.69c

HOOPS

Baltimore	4.00c
Boston	5.50c to 6.00c
Buffalo	4.05c
Chicago	3.75c
Cincinnati	4.05c
Cleveland	3.25c to 3.65c
Detroit, No. 14 and lighter	3.80c
New York‡‡	4.25c
Philadelphia*	3.40c
Pittsburgh	4.25c
Seattle	5.00c
St. Paul	4.00c

COLD FINISHED STEEL

	Rounds, hexagons,	Flats, squares
Baltimore (c)	3.50c	4.00c
Boston	3.55c	4.05c
Buffalo	3.95c	4.45c
Chicago	3.60c	4.10c
Cincinnati	3.85c	4.35c
Cleveland	3.65c	4.15c
Detroit	3.85c	4.35c
Los Angeles (a)	4.50c	.....
New York	3.60c	4.10c
Philadelphia*	3.60c	4.10c
Pittsburgh	3.70c	4.20c
Portland (a)	4.50c	.....
San Fran. (a)	4.25c	.....
Seattle (a)	5.00c	.....
St. Paul (a)	3.85c	.....
Tulsa	4.64c	5.14c

(a) Rounds only.

COLD ROLLED STRIP

Boston, 0.100-inch, 500 pound lots	5.30c
Buffalo	5.85c
Chicago (b)	6.10c
Cincinnati	7.15c
Cleveland (b)	5.95c
Detroit	5.80c
New York	5.15c
Philadelphia (c)	5.15c

(b) Net base, straightening, cutting, boxing 1 ton or more. (c) Plus mill, size and quantity extras.

SWEDISH IRON AND STEEL

New York duty paid

Hollow drill steel	13.00c
Iron bars, round	6.10c
Iron bars, flats and squares	6.50c

*Plus quantity differentials. ‡‡Minus quantity differentials. †† Domestic bars. **Less than 25 sheets. *†50 or more bundles.

Pacific Coast

Seasonal Lull in Buying Has Appeared in California —Much Work in Prospect

BUYING of iron and steel in the San Francisco district is experiencing the usual spring lull, but at Seattle the heaviest buying of the spring is noted. Much construction work is in prospect in both areas. Less competition is being met from imported material. Pig iron from India and by-product coke from England have been advanced $1.

San Francisco, April 20.—(*By Air Mail*)—Activity in the Pacific coast iron and steel markets reflects the usual seasonal recession. This is especially noticeable in demand for cast iron pipe, few awards or new inquiries developing. Prices continue fairly firm at levels established a few weeks ago.

Pig Iron and Coke

A shipment of several hundred tons of foreign pig iron arrived this week and due principally to an increase in freight rates, Indian iron has advanced $1 a ton, from $24 to $25 a ton to $25 to $26 a ton, c.i.f., duty paid. One large importer of coke this week unloaded in various Pacific coast ports 3000 tons of English beehive and by-product coke. The same importer has about 5000 tons scheduled to arrive in June. Prices on English by-product coke have advanced $1 a ton and it is now $12.50 to $13.50, net ton, delivered incoming cars. On beehive $16 to $17 is quoted.

Coast Pig Iron Prices

Utah basic	$25.00 to 26.00
Utah foundry	25.00 to 26.00
*German	24.25
*Indian	25.00 to 26.00

*C.i.f. duty paid.

Bars, Plates and Shapes

Concrete bar awards this week aggregated 1540 tons, the largest weekly tonnage in over a month, and brought the year to 23,621 tons. A warehouse in Oakland, 400 tons, was booked by Pacific Coast Steel Co. Pending business calls for more than 5000 tons. Prices on out-of-stock material continue firm at 2.30c, base, on carload lots. Demand for merchant bar material is far from strong but prices hold fairly firm to 2.35c c.i.f.

Activity in the plate market has increased somewhat, due principally to the fact the Southern Pacific Equipment Co. has come into the market for 3000 tons for 300 flat cars to be built in its own shops. Awards this week included 600 tons for caissons for the Southern Pacific bridge over the Carquinez straits, placed with Western Pipe & Steel Co. To date this year 57,559 tons have been booked, compared with 11,419 tons for the same period a year ago. An award is expected in a few days on 240 tons for a riveted or welded pipe line at Sierra Madre, Calif. Plate price continues 2.35c c.i.f.

Leading structural awards of the week was 444 tons for a warehouse in Oakland for the port commission, booked by the Pacific Coast Engineering Co. So far this year awards aggregate 61,866 tons, compared with 54,840 tons for the corresponding period in 1928. Pending business exceeds 18,000 tons and includes 2200 tons for 300 flat cars for the Southern Pacific Equipment Co., and 250 tons for a hotel in Yakima, Wash. On plain domestic material 2.35c c.i.f. Coast ports holds firmly.

Other Finished Material

Demand for cast iron pipe is light and awards this week totaled only 227 tons, bringing the aggregate for the year to 34,233 tons, compared with 24,249 tons for the same period a year ago. The largest award went to Pacific States Cast Iron Pipe Co. and called for 175 tons for a water company in Menlo Park, Calif. Pending business totals less than 2000 tons.

Seattle Mills Are Busy

Seattle, April 17.—Steel awards this week were the heaviest of any week this year, totaling more than 7200 tons of shapes, plates and reinforcing materials. Of this amount 6500 tons are involved in two contracts for 1100 railroad car frames taken by the Pacific Car & Foundry Co. This work will be done at the company's Renton shops and are the largest of like nature ever placed in the Pacific Northwest.

Steel mills are operating steadily with a fair volume of new business being placed, much of it in small tonnages. The jobbing trade is buying usual amounts of merchant bars, unchanged at 2.35c. Prices of reinforcing material have been advanced from 2.20c to 2.30c, and are firm. Pending are 300 tons for Honolulu, 900 tons in the city-county building, Seattle, and 2000 tons for Merchants Exchange building. Northwest Steel Rolling Mills has booked 125 tons for National Automotive Service building, Seattle, and 100 tons for Wenatchee medical and dental building.

Among the exhibits which attracted unusual attention at the recent exhibition held in connection with the thirty-third annual meeting of the American Foundrymen's association in Chicago, was that of Rogers Brown & Crocker Bros. Inc., Cincinnati. This company exhibited foundry coke, pig iron, molding sand, fire clay, and many alloys.

Scrap Conference May 23 at Pittsburgh

Resolutions to be submitted at the trade practice conference to be held at Pittsburgh, May 23, by the federal trade commission for the iron and steel scrap industry will be formulated by a trade relations committee organized by the Institute of Scrap Iron and Steel, New York.

Among subjects to be considered are top-dressing cars, defamation of competitors, overbilling of shipments, failure to fulfill on contract, inducing breach of contract, wrongful billing of scrap and commercial bribery. The conference has been arranged by Benjamin Schwartz, director general of the institute.

Charles Dreifus, Charles Derifus Co., Pittsburgh, is chairman of the trade relations committee. Charles Bock, M. Bock & Son, Buffalo, is co-chairman. Other members are Joel Claster, Luria Bros. & Co., Reading, Pa.; Harry Ehrlich, Springfield, Mass.; Joseph G. Hitner, Henry A. Hitner's Sons Co., Philadelphia; Herman D. Mockowitz, Schiavone-Bonomo Corp., New York; John R. Briggs, Henry Potts & Co., Philadelphia; George B. Doane, Perry Buxton Doane Co., Boston; Ben Cohen, Louis Cohen & Son, Wilkes-Barre, Pa.; Joseph Maher, Pennsylvania Wood & Iron Co., Buffalo; Carl R. Briggs, Briggs & Turivas, Blue Island, Ill.; Samuel Summer, Joseph Schonthal Co., Columbus, O.; and Morris Speer, Rotter-Speer Co., Cleveland.

Babbit Sales Expand

Washington, April 23.—In sales, apparent consumption and consumption by producers, babbit metal showed a marked gain in March. First quarter statistics of the department of commerce also registered a sharp increase, as the following comparison shows:

	Total apparent consumption	Sold by manufacturers	Consumption by producers
	(Figures given in pounds)		
1928			
January	4,928,517	4,034,352	894,165
February	4,470,368	3,443,694	1,026,674
March	4,927,634	3,903,071	1,024,563
Total (3 mos)	14,326,519	11,381,117	2,945,402
April	4,842,656	3,724,691	1,117,965
May	4,606,899	3,578,422	1,028,477
June	4,731,023	3,625,347	1,105,676
July	4,692,825	3,816,707	938,955
August	4,755,662	3,843,680	911,982
September	5,308,403	4,309,004	999,399
October	5,796,419	4,605,179	1,191,240
November	5,630,417	4,356,670	1,273,747
December	4,985,942	4,148,601	837,341
Tot. (1928)	59,676,765	47,338,625	12,338,140
1929			
January	6,093,267	4,876,506	1,216,761
February	5,720,243	4,695,669	1,024,574
March	6,465,613	5,171,047	1,294,566
Total (3 mos.)	18,279,123	14,743,222	3,535,901

Monongahela, Ohio River Shipments Record

Pittsburgh, April 23.—March shipments of iron and steel products over the Monongahela and Ohio rivers were a record for that month, according to the United States engineers here. Twenty-five tons were shipped over the Allegheny river in March, the first tonnage so far this year, compared with 725 tons in March of last year.

The Monongahela total of 93,627 tons was the largest monthly figure so far this year and compares with 77,908 tons in the 1928 period. Shipments over the Ohio increased from 72,203 tons in February to 92,040 tons last month. This compares with 77,945 tons a year ago.

Shipments for the first quarter over the Monongahela of 257,377 tons compare with 229,337 tons in the first quarter of 1928. The Ohio aggregate for the first three months, however, declined from 235,330 tons last year to 212,714 tons in the 1929 period. Comparisons follow:

1929	Allegheny	Monongahela	Ohio
January	.....	80,402	48,471
February	.....	83,358	72,203
March	25	93,627	92,040
1928			
December	.....	79,595	78,213
November	800	143,238	137,019
October	1,130	131,281	130,808
September	200	136,227	125,062
August	50	109,738	124,066
July	.....	91,834	90,145
June	2,350	75,422	96,156
May	1,863	86,722	112,818
April	470	87,581	110,356
March	725	77,908	77,945
February	385	73,360	87,635
January	330	78,069	69,750
Total	8,303	1,160,975	1,239,973

Independent Sheet Sales Increased In March

Sheet sales by independent mills increased from a daily rate of 13,910 tons in February to 14,977 tons in March. Production increased from 11,659 tons to 11,748 tons, and shipments rose from 11,637 to 11,731 tons. Total sales for March was 464,297 tons; production 364,202 tons and shipments 363,648 tons. The report from the National Association of Flat Rolled Steel Manufacturers for March follows:

	Net tons	Per cent of capacity
Total sales for March	464,297	146.8
Total production	364,202	115.2
Total shipments	363,648	115.0
Unfilled tonnage as of March 1	791,615	250.3
Approximate finished stock on hand awaiting shipments	125,653	39.7
Approximate in stock, unsold	63,397	20.0

Total number of hot mills in the United States is 722 having a capacity for March, 1929, of approximately 468,200 net tons, and the percentage of the capacity to which the figures shown are related is 67.6.

A monthly comparison of sales, production and shipments for the past two years is afforded by the following table:

	Sales	Production	Shipments
January, 1927	261,357	256,856	239,019
February	241,951	282,171	261,412
March	345,900	359,340	338,436
April	292,965	316,100	300,858
May	212,337	309,360	302,759
June	224,321	300,706	281,395
July	230,715	237,243	252,034
August	177,647	266,645	266,713
September	258,427	220,919	230,443
October	234,358	245,765	232,626
November	344,519	232,041	224,789
December	530,197	260,130	221,689
January, 1928	302,921	316,541	274,126
February	266,210	330,565	298,420
March	399,441	366,127	359,522
April	284,070	327,909	327,674
May	250,316	349,367	326,324
June	318,902	311,629	308,741
July	333,357	267,685	278,310
August	254,397	329,396	324,691
September	370,936	318,907	322,876
October	344,614	369,243	354,925
November	346,041	358,402	307,790
December	323,421	302,182	296,687
January, 1929	438,390	391,404	362,229
February	389,496	326,468	325,848
March	464,297	364,202	363,648

Crude Magnesite Output Up in 1928

Output of crude magnesite in the United States in 1928 was 127,190 short tons valued at $1,098,470, states the federal bureau of mines. Over 1927 this was an increase of about 5 per cent, but it is by no means a record.

Domestic sales in 1928 included 620 tons of crude valued at $5690 at the mine, 9570 tons of caustic valued at $304,500, and 48,980 tons of dead-burned valued at $1,226,620. Export sales in 1928 included 842 tons of crude valued at $7593, 5395 tons of caustic valued at $130,890, and 57,265 tons of dead-burned valued at $836,386.

Following is the bureau of mines comparison of magnesite supply in the United States, expressed as crude magnesite, in short tons:

Year	Domestic	Imported	Total*
1922	55,790	217,861	273,651
1923	147,250	151,092	298,342
1924	120,100	148,700	268,800
1925	120,660	142,283	262,943
1926	133,500	196,318	329,818
1927	121,490	149,126	270,616
1928	127,190	157,492	284,682

*Prior to 1924 a factor of 2 tons of crude to 1 ton of calcined was used in expressing imports as crude magnesite. Since 1924 the factors used are 2 to 1 for imports from Italy and 2½ to 1 for other imports.

Budgets Track Material

Toronto, Ont., April 23.—Appropriation for the Canadian National railways, now before the dominion parliament at Ottawa, Ont., includes 169,000 tons of rails, 7,400,000 steel tie plates and 1,350,000 rail anchors. For the construction of bridges and culverts an expenditure of $2,632,000 is estimated.

The Carborundum Co., of Niagara Falls, N. Y., is now occupying its new building at 2759 East Grand boulevard, Detroit.

Steel Castings Bookings Up in March

Washington, April 23.—Bookings of commercial steel castings in March registered a gain of 50 per cent over last March. Following is a comparison by the department of commerce:

	—Bookings—		—Production—	
	†Total net tons	Railway specialties	†Total net tons	Railway specialties
1928				
March	83,755	30,992	93,989	38,448
April	84,086	32,810	86,016	32,619
May	86,796	34,995	93,333	36,599
June	72,107	22,597	91,746	30,742
July	66,992	20,483	78,648	27,501
Aug.	81,286	25,171	87,742	27,157
Sept.	82,762	35,234	75,761	25,311
Oct.	78,860	26,736	87,952	29,471
Nov.	84,742	34,545	82,385	30,799
Dec.	96,373	43,928	82,203	26,484
Total	1,000,283	389,863	1,021,956	371,564
1929				
Jan.	124,313	64,809	93,413	35,689
Feb.	115,539	58,903	97,468	40,282
Mar.	130,271	60,677	114,632	43,348

†For tonnage of miscellaneous castings deduct Railway Specialties from the total.

Pig Iron

(*Concluded from Page* 1145)

been. A little iron is going outside the district, but not the tonnage anticipated. Four producers of foundry iron here declare their price is firm at $15.50, base, Birmingham. However, sales have been made at $15 for shipment to distant territory.

Philadelphia, April 23.—Considerable tonnage of foundry iron was sold in this district in the past week, mainly at $21 base, eastern Pennsylvaia furnace, or equivalent. Producers now generally are quoting $21.50, base, although not much business has been transacted at the new price. Fair sales of low phosphorus iron are noted at unchanged prices. Some business is pending for early action.

Toronto, Ont., April 23.—Demand for merchant pig iron in the Canadian markets continues steady. Current sales are almost entirely for spot delivery. Shipments are large.

Chicago, April 23.—Shipments of northern pig iron continue heavy. Furnace interests do not expect to be able to stock iron in any quantity for some time, but are able to meet current delivery needs. Spot orders are exceeding expectations. Shipment on one order of southern iron placed in this district will be by barge and rail from Birmingham, instead of all-rail. Selling is being extended into third quarter. Spot and future sales of northern iron are steady on the basis of $20, Chicago furnace, for base grades.

Sales of pig iron to be delivered to the Chicago-Milwaukee district from eastern lake furnaces total 25,000 to 30,000 tons, including one shipment to replace a cargo lightered last season. Silicon differentials are being waived on these orders, making the price of the boat iron here 50 to 75 cents under the Chicago base furnace price. The market, however, is undisturbed by these sales, or those of southern iron below $15.50, base, Birmingham. Northern iron shipments this month are slightly ahead of those of March.

Putting Final Touches on Tariff Bill; May Not Pass Till Autumn

By Lynne M. Lamm

WASHINGTON, April 23.—The new tariff bill may be introduced any day. At this writing details of the bill are being guarded with a secrecy never known since tariff legislation became a matter of great public interest.

Representative Garner, of Texas, ranking Democratic member of the committee, in a partisan speech in the house has complained of "leaks" to "big interests." His complaint seemed to center on certain definitions of newsprint; counsel for newspaper publishers wired a definite definition to more than 300 editors, seeking their opinion.

But up to last Saturday it was stated that neither rates nor administrative provision of the proposed bill had been finally approved by majority members of the house ways and means committee. One of the first schedules approved by any subcommittee was that on metals, but even the so-called "big interests" have no information yet.

Chairman Hawley of the ways and means committee was insistent up to the last minute that the bill would be completed by April 20, but members of the committee now feel that they will be fortunate if the bill is completed by April 27. Most of the guesses now are that it will take the house about a month or so to complete its work on the bill. In other words, it is figured that the bill should be passed by the house about June 1.

There is considerable serious talk at the capitol that the house will propose adjournment while the senate finance committee is holding hearings. The estimates for such an adjournment have been from one to two months.

Much talk has been current to the effect that the finance committee of the senate, charged with writing or rewriting the tariff bill, will not hold any hearings in view of the complete hearings held by the house. This talk is not considered seriously. On the other hand, that committee will have a precedent to follow if the hearings are in executive session and not open as those held in the house. In 1922, the time of the enactment of the last tariff bill, the hearings before the finance committee were in executive session.

It is generally conceded that it will take the finance committee at least three weeks to hold hearings and make changes in the bill. This is a conservative estimate. In view of the fact that the house expects to take until about June 1 to pass the bill, the senate committee to take at least three weeks, brings the bill to July 1. This gives a pretty clear indication that the bill cannot become law by the middle of July, as at one time suggested by congressional leaders. It is being freely predicted now that it will be August or perhaps September before the bill can become law.

March Output of Autos a High Record

Washington, April 23.—Both United States and Canadian production of automobiles set an alltime record in March. In the United States 584,733 cars and trucks were made, exceeding by a wide margin the previous record, 475,373 units in February, according to the department of commerce. Canadian output was 40,621 units, as the following comparison shows:

	United States			Canada†
1928	Total	Passenger cars**	Trucks	Total
Jan.	231,728	205,646	26,082	8,463
Feb.	323,796	291,151	32,645	12,504
Mar.	413,314	371,821	41,493	17,469
Total, 3 mo.	968,838	868,618	100,220	38,436
April	410,104	364,877	45,227	24,211
May	425,783	375,863	49,920	33,942
June	396,796	356,622	40,174	28,399
July	392,086	338,792	53,294	25,226
Aug.	461,298	400,593	60,705	31,245
Sept.	415,314	358,891	56,423	21,193
Oct.	397,284	340,146	57,138	18,536
Nov.	*257,140	217,454	*39,686	11,769
Dec.	*234,116	205,993	*28,123	9,425
Total, year	*4,358,759	3,827,849	*530,910	242,382
1929				
Jan.	*400,695	*349,111	*51,584	21,501
Feb.	*475,373	416,848	*58,525	31,287
Mar.	584,733	515,174	69,559	40,621
Total, 3 mo.	1,460,801	1,281,133	179,668	93,409

*Revised. **Includes taxicabs. †Reported by dominion bureau of statistics.

Iron Output Down, Steel Rises, in Canada

Toronto, Ont., April 23.—Production of pig iron in Canada for March amounted to 86,176 long tons, 8 per cent less than the 93,939 tons of February, but 10 per cent over the 78,390 tons produced in March, 1928. Compared with February, March output of foundry iron advanced to 7958 tons from 5947, while basic iron decreased to 74,070 tons from 84,835, and malleable from 5157 tons to 4148.

For the three months ending March 31, production of pig iron amounted to 267,879 tons, an increase of 29 per cent over the 208,087 tons of the corresponding period of 1928.

Output of ferroalloys in March was 5790 tons. For the quarter production was 18,237 tons, compared with 13,304 tons a year ago.

March production of steel ingots and direct steel castings was 137,158 tons, a gain of 17 per cent over the 117,445 tons produced in February and 16 per cent higher than the 118,258 tons made in March, 1928. Compared with February, March showed an advance in steel ingots to 131,329 tons from 112,027, and steel castings to 5829 tons from 5418.

Production for the first quarter totaled 370,863 tons, 23 per cent higher than the 301,373 tons of the corresponding period of last year. The output included 354,362 tons of ingots and 16,501 tons of castings.

Equipment Orders High

Cleveland, April 23.—Orders for foundry equipment in March were the best since last August and have been exceeded only twice since the Foundry Equipment Manufacturers' association began compiling statistics. Comparisons follow:

	1926	1927	1928	1929
Jan.	168.2	180.4	132.7	180.5
Feb.	154.9	198.0	123.6	197.0
Mar.	157.3	131.1	138.6	209.4
Apr.	113.2	130.0	107.7	.....
May	128.5	134.8	335.6	.....
June	133.5	138.4	149.1	.....
July	127.3	89.9	94.8	.....
Aug.	141.2	106.4	278.0	.....
Sept.	114.0	80.4	170.0	.....
Oct.	140.5	98.0	185.0	.....
Nov.	133.4	95.8	197.8	.....
Dec.	181.0	106.8	166.5	.....

Base: Average monthly shipments for 1922-23-24.

March Exports Increase Imports Decline

Washington, April 23.—Preliminary statistics of foreign trade in March give exports of iron and steel as 270,925 gross tons, an increase of 11,214 tons over February. Imports in March totaled 52,622 tons, compared with 58,146 tons in February.

In the first quarter, exports of iron and steel have totaled 804,932 tons, an increase of 191,410 tons or 31.3 per cent over the same period of 1928. Imports, on the other hand, in the quarter totaled only 165,610 tons, compared with 182,081 tons in 1928, a reduction of 16,480 tons or 9.1 per cent.

Erie railroad has placed an order for 250 gondola cars in which Toncan Iron, a rust-resisting product of the Central Alloy Steel Corp., Massillon, O., has been specified for floors and sides.

Industrial Men in the Day's News

William G. Costin, Chairman, Pittsburgh Screw & Bolt Co., Pittsburgh

FROM a bookkeeper's stool in a $50,000 company, he has risen in a little more than 30 years to its chairmanship, the newly-formed company having over $18,500,000 in assets.

ATTENDANCE at night school while employed in a minor capacity by a railroad in Washington fitted him for his great opportunity encountered upon removal to Pittsburgh.

FLYING is more than a hobby, since included in the recent merger of his company with three other interests is one which manufactures chrome vanadium steel propellers.

PITTSBURGH often has proved "the happy hunting grounds" for those seeking success. The hunt, however, has been successful only to those with ability and ambition and pluck. This has been borne out by many men entering the iron and steel business directly since the time of Andrew Carnegie, and also by many in the consuming lines.

Conspicuous in the latter group is William G. Costin, chairman of the board of the Pittsburgh Screw & Bolt Co., Pittsburgh, the reorganization of which was noted in IRON TRADE REVIEW of Feb. 14. This reorganization is the merger of three companies with assets exceeding $18,000,000.

Mr. Costin was born in Virginia in 1874 and when 15 moved to Washington. While in the employ of the Southern Railway he went to night school. Six years later, or in 1895, he went to Pittsburgh, and two years later, when the initial Pittsburgh Screw & Bolt Corp. was formed, became a bookkeeper. From this post he was advanced to bookkeeper accountant, and in 1900 he became secretary.

In that year Mr. Costin was instrumental in forming the Fort Pitt Forge Co., manufacturer of rivets and forgings. Of that company he became president and general manager, which, when proved entirely successful, was taken over by the Pittsburgh Screw & Bolt Corp. In 1902 he again was promoted to vice president and general manager, and then six years later, or 11 years from the time he was employed as bookkeeper, he was elevated to the president's chair. He has served the corporation as chairman of the board since 1920.

Throughout his more than 30 years' identification with this interest, Mr. Costin has been not only closely associated with its rapid expansion but also has been largely instrumental in bringing it about. Always quick to see an opportunity and take advantage of it, he has recommended purchases, expansions and acquisitions when others perhaps would have adopted a more conservative course. Mr. Costin is a believer in the old adage "nothing ventured—nothing won."

The Gary Screw & Bolt Co., Gary, Ind., was formed in 1911, and in 1925 the Continental Bolt & Iron Works, Chicago, was purchased. In October, 1928, the Colona Mfg. Co., Monaca, Pa., was formed to manufacture thread protectors for casing and oil pipe. Mr. Costin was made president. That same month marked his real entry into the aviation field. The Dicks Aeronautical Corp., Pittsburgh, holder of patent rights for the manufacture of hollow chrome vanadium steel airplane propellers, was acquired. About this same time the Graham Bolt & Nut Co., Neville Island, Pittsburgh, was absorbed.

And as previously noted, in February the new Pittsburgh Screw & Bolt Co., with Mr. Costin as chairman, was formed to take over the stock of the Pittsburgh Screw & Bolt Corp. and the three other companies.

Mr. Costin is fond of outdoor sports. He is a golfer and also enjoys horseback riding, the liking for which he acquired as a boy. His interest in aviation proceeds further than propeller manufacture and he no longer is considered a novice in flying. He is a member of the Duquesne, Allegheny and Oakmont Country clubs, Pittsburgh Athletic association, Pittsburgh Golf and Keystone Athletic clubs of Pittsburgh, and other social organizations in that city and New York.

Men of the Industry

FRANK F. SEAMAN has been appointed general manager of the newly established crane and hoist division of Robbins & Myers Inc., Springfield, O., manufacturer of electric motors, motor-generator sets, electric fans, etc. Since 1902 Mr. Seaman has been engaged continuously in the design, manufacture and sale of hoisting machinery successively with the Sprague Electric Works, Yale & Towne Mfg. Co., Stamford, Conn., Toledo Bridge & Crane Co., Toledo, O., Euclid Crane & Hoist Co., Euclid, O., and the Chisholm & Moore Mfg. Co., Cleveland.

FRANK F. SEAMAN

Carl E. Schirmer, who has been appointed chief engineer in the new department of Robbins & Myers Inc., has been in the hoist business since 1907. He formerly was assistant engineer of the material handling division of both the Union Pacific railroad and the Schaffer Engineering Co., Tiffin, O. He has been chief engineer of Toledo Crane Co., Bucyrus, O., and Chisholm & Moore Mfg. Co., Cleveland.

John R. Mears, appointed to have charge of sales, has had 15 years experience in hoist and crane selling, latterly with Chisholm & Moore.

District sales managers have been appointed as follows: Albert Kreh for New York, William J. Scott for Chicago, and John J. Becker for Detroit.

* * *

William H. Ramage, president of the Valley Mould & Iron Corp., Hubbard, O., has taken control of the Insulated Top Co., Pittsburgh.

* * *

Harold H. Seaman, president of the Seaman Body Corp., Milwaukee, was recently elected a director of the Nash Motors Co., Kenosha, Wis., which owns half of the Seaman Body Corp.

* * *

A. E. Avery, of the Kennedy Co., Cleveland, and L. A. Skeel, of the McKay Steel Homes & Buildings Inc., Cleveland, were recently elected president and vice president, respectively, of the Construction club, that city.

* * *

Joseph H. Gilmore, vice president of the Union Barge Line Corp., Pittsburgh, has been appointed acting president in place of Charles T. Campbell, resigned.

* * *

G. LaRue Masters recently was made sales manager of the National Lock Washer Co., Newark, N. J., manufacturer of spring washers for railroads and general industries, car window equipment, forgings and marine speed indicators.

* * *

William C. Dickerman, director of the American Car & Foundry Co., New York, and of several other corporations, has been elected president of the American Locomotive Co., New York, succeeding William H. Woodin, who remains as chairman of the board. Mr. Dickerman was also elected a director.

* * *

R. J. Wenger, who, as noted in IRON TRADE REVIEW of April 18, was elected vice president of the Reading Iron Co., Reading, Pa., at the recent annual meeting, has been with the company 24 years, latterly as assistant to the president. He started with the company as a messenger boy.

* * *

E. J. Hergenroether, formerly assistant metallurgist of the Cadillac Motor Car Co., Detroit, now is associated with the development and research department of the International Nickel Co., 67 Wall street, New York. Mr. Hergenroether's headquarters will be at the company's Detroit office, 4-117 General Motors building.

* * *

Lucien W. Moore, who has been with the Compagnie Crane of Paris, France, since 1923, recently was appointed managing director of Compagnie Crane of Belgium, and has moved to Brussels.

A. P. Keisker, whom Mr. Moore succeeds, is returning to the United States to become manager of Crane Co.'s branch at Savannah, Ga.

* * *

A. F. White, who has been assistant superintendent of the Donora, Pa., steelworks of the American Steel & Wire Co., has been appointed general superintendent there to succeed J. B. Clark, who retires at his own request May 1 on a pension, after a quarter century with the company. Mr. Clark has spent 48 years in the steel business.

JOHN R. MEARS

Mr. White is succeeded by W. F. Conlin, who has been superintendent of the Donora, Pa., open-hearth plant.

* * *

William H. Woodin, chairman of the board of the American Car & Foundry Co., New York, and director of the Federal Reserve bank, New York, received the honorary degree of doctor of laws from Juniata college, Huntingdon, Pa., April 17.

* * *

Gordon S. Meek, for about 20 years superintendent of the Pennsylvania & Lake Erie Dock Co., Fairport, O., has been appointed superintendent of the Pittsburgh & Conneaut Dock Co., Conneaut, O., and general manager of

the Pennsylvania & Lake Erie Dock Co. He succeeds the late R. R. Richardson.

H. D. Prosser, who has been chief clerk and cashier for Fairport company, succeeds Mr. Meek there.

Mr. Meek has been associated with United States Steel Corp. docks for more than 30 years.

* * *

George R. Hann has been elected a director of Mackintosh-Hemphill Co., Pittsburgh. He succeeds John Chalfant, resigned.

* * *

W. K. Kavanaugh, St. Louis, president, Southern Coal, Coke & Mining Co., has been elected vice president of the Mississippi Valley association.

* * *

R. S. Begg has been appointed chief engineer of the Stutz Motor Car Co. of America, Indianapolis. He recently resigned as chief engineer of the Budd Wheel Co., Philadelphia.

* * *

Howard Goodman, 940 Seneca street, Buffalo, has been appointed agent for the General Naval Stores Co., Cincinnati. He formerly was connected with Spencer-Kellogg Co., Buffalo.

* * *

Ernst C. Heyde has resigned from the Standard Sanitary Mfg. Co., Richmond, Calif., to become foundry superintendent with Skalla & Co., Buenos Aires, Argentine Republic.

* * *

John Flynn, for 15 years superintendent of Williams Foundry & Machine Co., recently acquired by the National-Erie Co., Erie, Pa., has become affiliated with Franz Foundry & Machine Co., Barberton, O.

* * *

William J. Mulcahy has resigned as secretary of Charles C. Kawin Co., 431 South Dearborn street, Chicago, and Frank R. Geis has resigned as chief chemist of the same company, to establish metallurgical laboratories at 604 Mission street, San Francisco.

* * *

H. G. Dalton, of Pickands, Mather & Co., Cleveland, and B. A. Tomkins, president of the Bankers Co., of New York, bond subsidiary of the Bankers Trust Co., New York, were elected directors of the Central Alloy Steel Co., Massillon, O., April 16. Mr. Dalton fills the vacancy caused by the death of Henry Coulby and Mr. Tomkins replaces Bayard Dominick. Thirteen other directors were re-elected.

* * *

E. M. Hummer, vice president and general manager of the Defiance Machine Works, Defiance, O., is scheduled to sail from New York, May 8, for a two-month trip to Europe, visiting the country's various representatives and agents. He plans to spend several weeks in Russia supervising the installation and operation of machines to build farm wagons for the Soviet government.

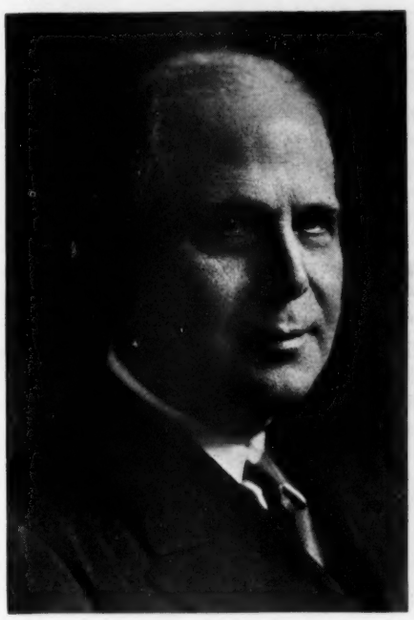
* * *

H. B. Spackman, who resigned as vice president and purchasing agent of the Lukens Steel Co., Coatesville, Pa., was elected chairman of the executive committee of the board of directors.

Hugh Kenworthy, formerly assistant purchasing agent, was appointed purchasing agent to succeed Mr. Spackman.

* * *

Henry W. Armstrong, formerly assistant treasurer, Joseph Dixon Crucible Co., Jersey City, N. J., was recently elected treasurer of the company. Mr. Armstrong was born in Jersey City and began his career as office boy for the Dixon company in 1903. He later served in the export and sales departments. In 1920 he was appointed credit manager and in 1926 was elected assistant treasurer of the company.



CHARLES P. ROGERS

Who as noted in IRON TRADE REVIEW of April 18 was elected president of Beals, McCarthy & Rogers Inc., Buffalo warehouse interest, to succeed the late Eugene J. McCarthy

* * *

C. Frank Blackmer has been appointed general superintendent in charge of all operations of the American Steel & Wire Co., Chicago, to succeed H. A. Barren, who, as noted in IRON TRADE REVIEW of April 11, retired on pension. Mr. Blackmer has been general superintendent of the company's wire mills since December, 1927.

John C. Hopkins, recently made general superintendent of blast furnaces and steelworks of the American Steel & Wire Co., has been superintendent of the Central furnaces at Cleveland since Dec. 15, 1922.

Henry A. Squibbs, who has just been appointed assistant general manager of sales of the American Steel & Wire Co., Chicago, has been manager of the fence and post sales department there since October, 1924.

* * *

George Beaton, formerly pattern shop foreman and later general superintendent of shops and assistant master mechanic, has been made mechanical superintendent of the Dominion Iron & Steel Co., Sydney, N. S. Mr. Beaton is the inventor of an improved type of tuyere extensively used on blast furnaces.

R. G. McIsaac, formerly machine shop superintendent, has succeeded Mr. Beaton as superintendent of shops.

* * *

James C. Davis, formerly fourth vice president in charge of foundry operations of the American Steel Foundries, Chicago, has been elected advisory vice president in charge of operations.

A. W. Walcher, formerly assistant to the fourth vice president, was appointed vice president in charge of operations.

F. A. Lorenz Jr., formerly assistant to the fourth vice president in charge of operations and works manager of the Indiana Harbor, Ind., plant, was made assistant vice president in charge of operations.

James Suttie, formerly assistant works manager of the Indiana Harbor plant, was named works manager.

Worden Wilson, formerly night superintendent there, was appointed assistant works manager.

Fritz B. Ernst, formerly assistant first vice president in the sales department, was made vice president, as was also Gabriel F. Slaughter, formerly sales agent for the company.

H. D. Hammond, formerly general manager of miscellaneous sales, was appointed vice president in charge of miscellaneous sales.

* * *

H. V. Leckie, formerly superintendent of the Cleveland plant of Steel & Tubes Inc., division of the Republic Iron & Steel Co., Youngstown, O., has been promoted to fill the newly created position of chief engineer in charge of the experimental and process departments.

Mr. Leckie was succeeded as general superintendent by Edward Kamper, formerly general superintendent and manager of the Standard division

(*Concluded on Page* 1166)

Here and There in Industry

Timely Information Which Records Developments in Various Lines of Productive Enterprise

LAKE SHORE ENGINE WORKS, Marquette, Mich., has been taken over by Milwaukee, Detroit and Iron Mountain, Mich., interests, which have purchased control by taking over 57 per cent of stock formerly held by the Longyear estate. New owners include E. W. Krueger, president, and William E. Kinsella, vice president, Worden-Allen Co., and Charles L. Coughlin, president of the Evinrude Motor Co. and vice president and general manager of the Briggs & Stratton Corp.

* * *

BARKER STEEL CO., reinforcing steel, has removed from 310 Consolidated Gas building, Park Square, Boston, to rooms 919 and 920.

* * *

KOPPERS CO., Pittsburgh, has moved its offices from the Union Trust Building to the Koppers building, Grant street and Seventh avenue.

* * *

SULLY BRASS FOUNDRY LTD., Toronto, Ont., has removed from 2388 Dundas street, west, to 7 Wabash avenue.

* * *

AMERICAN ENGINEERING CO. has removed the New York offices of its stoker division from 100 Broadway to the American Radiator building, 40 West Fortieth street.

* * *

BOLAND & CORNELIUS, lake transportation, have removed offices from the Union Trust building, Cleveland, to 2904 Terminal Tower building, Cleveland.

* * *

CENTURY WOOD PRESERVING CO., Pittsburgh, will move its main offices the latter part of this month from 1053 Century building to 1738 Koppers building, that city.

* * *

FOLLANSBEE BROS., Wheeling, W. Va., expects to open its new sheet mill at Toronto, O., May 1. Mills will be electrified and will roll sheets up to 66 inches in width.

* * *

AMERICAN AIR FILTER CO., Bradford, Pa., has been formed by merger of the Midwest Steel & Supply Co. Inc. and Midwest Air Filters Inc., both of Bradford. General Air Filter Co., Lincoln Park, N. J., has been purchased by the new company and equipment and stock will be moved to Bradford. An addition, 30 x 120 feet, is being built at the plant at East Bradford.

* * *

BUFFALO FOUNDRY & MACHINE CO., Buffalo, is building a storage building, 60 x 225 feet, which will be equipped with a 40-ton electric traveling crane. The company's office building has been completed and is now in use.

* * *

HARRY E. SILFEN CO., 429 West Superior street, Chicago, recently incorporated, will manufacture forged iron products and ornamental bronze and brass lighting fixtures. Harry E. Silfen is president and John F. Andrews secretary and treasurer.

* * *

THOMAS IRON CO., Reading, Pa., has elected officers, as follows: President, L. E. Thomas; vice president, John M. Callen; secretary, George W. Delany; treasurer, Henry N. Yost; directors, the above officers and Randolph Stauffer.

* * *

WARREN ROLLING MILLS CO., Warren, O., has been incorporated by Charles B. Loveless, William J. Kerr and C. H. Anderson, to purchase part of the plant of the Warren Iron & Steel Co. for the manufacture of high carbon steel products.

* * *

BRIGGS & TURIVAS INC., Blue Island, Chicago, is dismantling the by-product coke plant, with 108 ovens, of the Mayville Iron Co., Mayville, Wis., originally the Northwestern Iron Co., and at one time the principal blast furnace plant of the Schlesinger interests of Milwaukee.

* * *

TRIPLEX LAWN MOWER CO., Platteville, Wis., has entered into a contract for five years with a Chicago concern for practically its entire output of machines. The contract calls for new patterns, with an attendant increase in equipment and larger quarters.

* * *

FLEMING MFG. CO., New Castle, Pa., has changed its name to Fleming Structural Steel Co. The change is made to represent more closely the nature of its business, structural steel fabrication having formed most of its activity for several years. No change in ownership, management or organization is involved.

* * *

VULCAN STAMPING & MFG. CO., 4036 West Lake street, Chicago, has completed a two-story addition 25 x 200 feet, to be used for the manufacture of steel pails and kits. P. H. McCarthy is president.

* * *

ROCKFORD SHEET STEEL CO., Rockford, Ill., formed recently, has established a plant at 121 Loomis street and is doing a general jobbing business in sheet metal. Paul Fischedick is president and G. E. Jeanmairet secretary and treasurer.

* * *

CANTON STAMPING & ENAMELING CO., Canton, O., has contracted with the Ferro Enamel Supply Co., Cleveland, for a continuous oil-fired porcelain enameling furnace with estimated capacity 7500 pieces of enamelware per hour. A similar furnace has been bought by the Ingram Richardson Mfg. Co., Bayonne, N. J., for production of metal signs, stove parts and similar parts.

* * *

WORCESTER TAPER PIN CO. has moved to larger quarters at 47 Lagrange street, Worcester, Mass. from 9 May street and additional machinery has been installed for the manufacture of screw machine products and hardware specialties. The firm, which takes the quarters formerly held by the Park Mfg. Co., has been operating on a 23-hour schedule since Jan. 1.

* * *

PHILLIPS WIRE CO., Pawtucket, R. I., branch of the General Cable Corp., has under option additional land adjoining its mill with a view of eventually enlarging its rolling mill. Purchase is reported to depend upon possibilities of a clear title. The option is operative to May 1. Plant officials report plans for rolling heavier copper bars, and installation of additional equipment depends on the purchase.

* * *

ROBBINS & MEYERS INC., Springfield, O., has announced a line of electric and hand-power cranes, hoists and trolleys, up to 10 tons capacity.

The executive, technical and sales personnel of the new division has been associated with the Chisholm-Moore Mfg. Co., Cleveland. This line will be in addition to the former line of Robbins & Meyers, which includes electric motors, motor generators and electric fans.

* * *

CHICAGO STEEL & WIRE CO. has opened district sales offices in Tulsa, Okla., at 519 East First street. M. P. Hare is district manager.

* * *

ROYAL APPLIANCES CORP., 120 Harrison avenue, Boston, recently incorporated, is planning erection of a plant to provide production facilities.

* * *

MILWAUKEE TOOL SALES CO., 1150 North Euclid avenue, St. Louis, is the name of a re-incorporation of the Milwaukee Tool & Forge Co.

* * *

MLEITNER & CO., 2322 Ogden avenue, Chicago, recently incorporated, manufacturer of soda fountain equipment, has been in business for 23 years as a partnership and has incorporated to give better facilities.

* * *

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., is redistributing its work in several departments. Patterns for castings to be used at East Pittsburgh are being transferred from Cleveland to Trafford City, Pa. The Cleveland foundry will be utilized for producing castings for other plants.

* * *

SULLIVAN MACHINERY CO., Chicago, has removed its offices from the Peoples Gas building, 122 South Michigan avenue, to the seventh and eighth floors of the Wrigley building, 400 North Michigan avenue.

* * *

WATERBURY FASTENER CO., Waterbury, Conn., has merged with the United States Fastener Co., South Boston. It is expected that operations will be consolidated at one plant or the other.

* * *

OLIVER FARM EQUIPMENT CO., South Bend, Ind., recently formed by merger of several producers of agricultural machinery, has absorbed the American Seeding Machine Co., Springfield, O., by exchange of stock. The plant probably will be enlarged.

* * *

WESTERN SCREW PRODUCTS CO., St. Louis, Joseph J. Hagen, president, has appointed F. J. Keller Co., Capps building, Fort Worth, Tex., its southwestern sales representative and Jenkins Brothers, Columbia, S. C., its southern representatives.

* * *

MANGANESE STEEL FORGE CO., Philadelphia, has opened a sales office at 623 Union Trust building, Cleveland, in charge of P. M. Hobbs. The company manufactures rolled and forged manganese steel products. Mr. Hobbs has been connected with the sales department at the main office and in the Chicago office.

* * *

TRUSCON STEEL CO., Youngstown, O., is planning heavy production this year for aviation demand for hangars, steel doors, metal lath, reinforced steel floors and expansion joints. Two complete hangars per week are being turned out, with capacity of one to 25 planes. Doors have been developed to give ease of operation for wide spans.

Best Steel Market Is In Americas

Exports of iron and steel from the United States in 1928, as compiled by the department of commerce, show a total of 2,865,103 tons. Materials were exported to almost every country of the world and almost every form of iron and steel was represented in some degree.

Canada and Japan were largest buyers, the former taking 1,178,063 tons and the latter 411,754 tons. Italy's share was 90,011 tons, Poland 63,412 tons, United Kingdom 54,069 tons, Mexico 83,116 tons, Cuba 65,205 tons, Argentina 98,442 tons, Brazil 83,900 tons, China 92,837 tons, Philippine Islands 84,217 tons.

It is of interest that the total exports to Central and South American countries reached a total of 663,257 tons and with Canada added a total of 1,841,320 tons is indicated as being exported to other countries in the western hemisphere, about 60 per cent of the total exports.

The largest item of exports was scrap, with 516,139 tons. Structural shapes and allied materials totaled 296,799 tons, taking second place. Tin plate was third, with 249,642 tons. Canada and Japan led in purchases of this material, with 48,343 tons and 55,991 tons, respectively.

Other large tonnages included black sheets, 179,286 tons, steel bars, 158,475 tons, plates, 166,269 tons.

The report indicates that Europe and Africa are not large buyers of American steel and Asia, outside of Japan and some tonnage to China, is not an important buyer.

Exports of leading commodities to important countries are shown below.

Exports of Iron and Steel Products for 1928

(In Gross Tons)

To	Pig Iron	Scrap	Bars	Plates	Sheets	Strip	Tin Plate	Structural Shapes	Rails and fastenings	Pipes and fittings	Wire	Nails	Bolts and nuts	Castings	Car Wheels and axles
Belgium	1,000	243	43	45	64	90	625	35	258	4,080	13	22	5	20	20
Germany	513	18,984	90	221	1,374	10	12	6	1	9	189	108	21	31	....
Italy	223	73,348	4	....	4,100	8	9,221	953	....	48	136	36	7	73	....
Poland and Danzig	....	63,274	....	....	....	....	....	....	....	37	77	2	....	22	....
United Kingdom	217	1,740	17,995	322	4,898	3,470	241	640	1,202	16,535	2,260	507	1,886	1,518	24
Canada	39,342	178,528	116,505	141,751	124,777	48,698	48,343	190,968	31,172	31,415	26,585	286	3,102	13,488	4,032
Cuba	595	2	5,224	2,053	7,876	439	4,073	8,866	5,604	8,892	7,597	3,670	1,091	574	2,204
Dutch West Indies	....	65	403	452	127	10	399	15,265	537	10,290	404	90	326	732	14
Argentina	....	410	759	1,093	9,163	50	22,460	4,939	4,715	21,126	29,495	482	806	188	111
Brazil	148	....	1,336	743	18,080	328	9,993	1,574	25,134	5,347	18,893	1,226	278	26	436
Chile	440	....	2,213	1,467	4,007	26	4,823	6,933	42,002	3,887	1,395	371	429	762	756
Colombia	75	....	4,688	293	9,448	122	1,905	5,967	12,348	19,326	6,878	2,429	502	52	164
Peru	106	24	2,636	699	2,380	35	4,955	2,427	4,086	6,642	1,063	560	456	59	259
Venezuela	6	....	1,624	1,674	2,385	62	309	13,950	3,432	51,848	2,495	601	391	250	30
British India	....	2	20	7	2,859	209	13,018	447	1,069	5,744	844	31	162	63	52
China	304	9,222	4,032	1,502	6,975	79	28,726	656	34,524	1,092	1,547	3,505	130	3	2
Java and Madura	....	95	97	3	7,605	16	2,571	57	1	10,188	964	146	27	1	1
Other Dutch East Indies	....	227	376	18	8,453	4	557	629	1	6,315	941	61	28	30	1,259
Japan	39,762	160,427	6,805	1,975	67,095	962	55,991	4,387	22,697	19,364	3,366	665	207	47	1,290
Philippine Islands	463	925	3,342	3,626	25,149	35	5,581	9,804	12,350	11,509	5,226	4,802	822	191	160
Australia	....	....	1,412	3,779	4,848	629	....	1,998	17	3,797	1,931	330	157	487	27

Men of Industry

(*Concluded from Page* 1163.)

of the company at Toledo. D. W. Collins has been appointed first assistant to Kamper.

* * *

R. L. Major Jr. has been elected president of Plate Fabrications Inc., recently organized with headquarters in the Stephen Girard building, Philadelphia. Joseph Levin is vice president in charge of sales. Fred A. Sotter is treasurer and Henry Sanville secretary and the officers and George E. Gude Jr. comprise the directorate. The company has entered into agreements to manage the Steel Plate Products Co. and Sotter Bros. Co., Pottstown, Pa., and sell the fabricated plate products of these companies. The company has a branch office at 15 Park Row, New York, in charge of Mr. Gude.

* * *

David C. Arthurs was elected a director of the Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

* * *

H. C. Hegelheimer, comptroller of the Dominion Chain Co., Niagara Falls, Ont., has been advanced to assistant general manager.

* * *

Frank R. Frost, president of the Superior Steel Corp., Pittsburgh, has been elected a director of the Rustless Iron Corp. of America, Baltimore.

* * *

Charles S. Roberts has been appointed engineer of sheet pilings at the Chicago office of the Bethlehem Steel Co. He formerly was assistant in structural sales in the Chicago territory.

* * *

L. K. Townsend has resigned as district sales manager at Indianapolis for the Pittsburgh Crucible Steel Co., Pittsburgh. His duties will be taken over by K. E. Porter, district representative at Cleveland.

* * *

R. G. Ebert, formerly assistant master mechanic at the National works, Monessen, Pa., of the American Sheet & Tin Plate Co., Pittsburgh, hs been appointed master mechanic at the company's Pennsylvania works, New Kensington, Pa., to succeed L. M. Shafer, who, as noted in IRON TRADE REVIEW of April 18, died April 12.

* * *

S. S. Rand, formerly affiliated with the Peck, Stow & Wilcox Co., Southington, Conn., and Cleveland, has been made vice president and director of sales of the McCaffrey File Corp., Philadelphia. He succeeds the late Frank Gould. Mr. Rand for seven years has been sales manager in the small tool and builders' hardware department of the Peck, Stow & Wilcox Co., Southington, Conn.

* * *

A. W. Howe, formerly secretary of the J. M. & L. A. Osborn Co., Cleveland, sheet metal jobber, was elected president and general manager at a meeting of the board of directors April 19, to succeed J. F. Reichert, who resigned to take a much needed rest. D. A. Hossler, formerly salesman for the company, was elected vice president and J. W. Harrison, formerly vice president, now is secretary. W. E. Lutton remains as treasurer.

J. T. Hagan, Cleveland district salesman for the American Rolling Mill Co., Middletown, O., will become affiliated with the Osborn company about May 1, and was elected a director to succeed Mr. Reichert.

Messrs. Howe, Hossler, Harrison and Lutton have been with the company 25 years or more.

Obituaries

JULIAN BURDICK, 50, president and general manager of the West Penn Steel Co., Brackenridge, Pa., since early in 1920, died unexpectedly at his Pittsburgh home April 21. He alco was vice president and director of the Thomas Spacing Mahhine Co., Pittsburgh.

Mr. Burdick was born at Newburgh, N. Y., Nov. 7, 1878. He prepared for college at Philips Andover academy and was a member of the 1902 class at Yale. From 1903 to 1905 he was affiliated with the Passaic Steel Co., Paterson, N. J., and for three years following, was connected with the Interstate Steel Co., Brackenridge, Pa. In 1908 he helped to organize the West Penn Steel Co., and was made secretary and treasurer. He was a member of the American Iron and Steel institute.

* * *

Frank Gould, vice president, McCaffrey File Corp., Philadelphia, died recently.

* * *

Elijah Bates, former treasurer of the McMyler-Interstate Co., Bedford, O., died April 21 at his home in Cleveland Heights.

* * *

Everett Beckwith, 65, of the Western Wheeled Scraper Co., Aurora, Ill., died recently while on a trip to Manila, P. I.

* * *

Allen B. Van Eschen, 48, foundry superintendent, Warman Steel Casting Co., Huntington Park, Calif., died April 5.

* * *

Edward J. Vilsack, Pittsburgh, a director of the Washington Tin Plate Co., Washington, Pa., and the Sterrett-Thomas Foundry Co., Pittsburgh, died April 16.

* * *

George R. Lombard of the Lombard Iron Works & Supply Co., Augusta, Ga., died recently. He was a member of the Southern Metal Trades association and was active in its affairs.

* * *

Philip Leslie Miller, 54, former president of the New York Harbor Dry Dock Co., New York, and former manager of the Canadian Vickers Co., Montreal, Que., died April 13 in Montreal.

* * *

W. G. Ross, 65, president of the Asbestos Corp. Ltd., of Montreal, died April 15. He was a director of several companies, among them the Canadian General Electric Co. and the Dominion Iron & Steel Co.

* * *

Newton A. Hemphill, 76, at one time president of the Mackintosh-Hemphill Co., Pittsburgh, manufacturer of rolling mill machinery, died in Pittsburgh, April 17. He retired from business in Pittsburgh in 1903 and later became identified with the oil business in Oklahoma.

* * *

Frank B. Toombs, 36, general sales manager of the Chicago Steel & Wire Co., Chicago, died recently at his home in that city. He also was treasurer and a member of the board of that company and was one of its organizers in 1914. Mr. Toombs was a native of Marquette, Mich., and was a graduate of the University of Minnesota.

* * *

James M. Glaster, 56, assistant secretary, International General Electric Co., Schenectady, N. Y., died April 19. He was affiliated with the General Electric Co. at Schenectady about 30 years and prior had been employed at the company's branches at Boston and Lynn, Mass.

European Tube Mills Organized

Syndicate To Regulate Production Completed at London—Shipbuilders and Automotive Manufacturers Leading Steel Consumers—2000 Tons of Ferromanganese Shipped to United States—Tin Plate Export Demand Is Heavy

European Headquarters,
IRON TRADE REVIEW,
Caxton House, Westminster, S. W.1

LONDON, April 23.—(*By Radio*)—Organization of an international steel tube syndicate has been completed in London. Leading European manufacturers have subscribed to the terms, the purpose of which is to regulate production. American manufacturers are not members of this syndicate.

Shipbuilders and automobile companies are the largest buyers of steel at present. Imports of steel are considerably restricted, except strip. Belgian producers are shipping in nut and bolt iron.

Production of Middlesbrough pig iron has been sold to June, and sales of east coast hematite also are well advanced. The market for galvanized sheets is dull. Demand for tin plate has improved, and exports are heavy. Some mills have sold their output to June.

Among recent shipments of ferromanganese by British makers are 2000 tons to the United States, and 2000 tons of spiegeleisen has been shipped to Canada.

A report from Berlin states exports are improving. Holland and Japan are buying plates. The market in Belgium is uncertain, according to a dispatch from Brussels, which adds that semifinished steel prices are firmer and bars easier. The general situation is satisfactory. A report from Paris states export business is quieter. Domestic demand is featured by heavy orders for structural steel.

British Exports Better; Less from Continent

LONDON, April 12.—(*European Staff Service*)—Prospects of British trade in iron and steel export markets are improving, while foreign competition in the domestic market is considerably restricted. This is due in part to the higher level at which prices on the continent are being maintained, as well as to the fact that continental producers are well booked with orders and can offer only belated deliveries. As reported by the London iron and steel exchange, overseas demand for certain classes of pig iron has improved. Continental manufacturers of semifinished steel have only small quantities to offer for the British market and are quoting prices which are scarcely competitive with those asked for British material. Of late most of the foreign semifinished steel sold in Great Britain has been German, and there seems a likelihood that supplies from this source will not be maintained, so that the prospects of British steelmakers are favorable. In finished steel export markets continue to buy slowly. Middlesbrough foundry pig iron remains at £3 7s ($16.25) per ton, but a slight increase would not be surprising. East coast hematite ranges between £3 14s and £3 15s ($17.95 and $18.20).

Engineering contracts recently awarded to British firms include: The complete equipment for a new cotton mill in Japan, to John Hetherington & Sons Ltd., Manchester; boiler house equipment amounting to £223,288 ($1,080,000) for the state electricity commission of Victoria, Australia, to John Thompson Ltd., Wolverhampton; also orders for a fleet of monoplanes for Australia, to A. V. Roe & Co. Ltd., Manchester, and an order for motor buses for the Argentine and San Salvador to the Associated Equipment Co. Ltd., Southall.

On the continent there are slight fluctuations in iron and steel prices,

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, April 22	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f. o. b. Ship at Port of Dispatch—By Cable		£ s d		£ s d		£ s d		£ s d
PIG IRON								
Foundry No. 3, Silicon 2.50-3.00	$16.49	3 8 0*	$16.98	3 10 0	$16.98	3 10 0	$16.49	3 8 0
Basic	15.76	3 5 0	16.01	3 6 0	16.01	3 6 0	15.76	3 5 0
Basic-bessemer	17.58	3 12 6†	16.01	3 6 0	16.01	3 6 0	15.76	3 5 0
Hematite, Phosphorus 0.02-0.05	17.95	3 14 0	23.66	605*	.....	.....	17.46	3 12 0
SEMIFINISHED STEEL								
Billets	$31.53	6 10 0	$26.19	5 8 0	$26.19	5 8 0	$25.22	5 4 0
Wire rods	41.83	8 12 6	30.92	6 7 6	30.92	6 7 6	30.92	6 7 6
FINISHED STEEL								
Standard rails	$37.59	7 15 0	$31.53	6 10 0	$31.53	6 10 0	$32.01	6 12 0
Merchant bars	1.79c	8 5 0	1.34c	6 2 0	1.34c	6 2 0	1.34c	6 2 0
Structural shapes	1.60c	7 7 6	1.12c	5 2 0	1.12c	5 2 0	1.12c	5 2 0
Plates, ship, bridge and tank	1.76c	8 2 6	1.39c	6 6 0	1.39c	6 6 0	1.42c	6 9 0
Sheets, black, 24 gage	2.28c	10 10 0	2.26c	10 5 0	2.26c	10 5 0	2.50c	11 7 0
Sheets, galvanized, 24 gage, corrugated	2.90c	13 7 6	3.01c	13 13 9	3.01c	13 13 9	3.43c	15 12 0
Bands and strips	2.17c	10 0 0	1.40c	6 7 6	1.40c	6 7 6	1.40c	6 7 6
Plain wire, base	2.06c	9 10 0	1.71c	7 15 0	1.71c	7 15 0	1.74c	7 18 0
Galvanized wire, base	2.93c	13 10 0	2.12c	9 12 6	2.12c	9 12 6	2.18c	9 18 0
Wire nails, base	2.39c	11 0 0	1.79c	8 2 6	1.79c	8 2 6	1.85c	8 8 0
Tin plate, base box 108 pounds	$ 4.49	0 18 6	.....	.....	.....	.....	$ 6.79	1 8 0

*Francs

Domestic Prices at Works or Furnace—Last Reported			Francs		Francs		Marks	
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$16.25	3 7 0	$18.57	475(2)	$17.24	620	$18.49	78
Basic pig iron	15.76	3 5 0	19.94	510(1)	16.96	610	20.86	88
Furnace coke	3.64	0 15 0	6.06	155	5.84	210	5.10	21.50
Billets	30.92	6 7 6	24.24	620	26.27	945	28.69	121
Standard rails	1.79c	8 5 0	1.46c	810	1.63c	1,250	1.51c	140
Merchant bars	1.84c	8 10 0	1.36c	755	1.40c	1,080	1.52c	141
Shapes	1.71c	7 17 6	1.31c	730	1.22c	940	1.49c	138
Plates, ship, bridge and tank	1.87c	8 12 6‡	1.54c	855	1.46c	1,120	1.71c	158
Sheets, black, 24-gage	2.28c	10 10 0	2.92c	1,620	2.70c	2,080	2.43c	225
Sheets, galvanized 24 gage, corrugated	2.93c	13 10 0	3.69c	2,050	3.84c	2,950	3.78c	350
Plain wire	2.12c	9 15 0	1.94c	1,075	2.08c	1,600	2.48c	230
Bands and Strips	2.17c	10 0 0	1.51c	840	1.76c	1,350	1.77c	164

*Middlesbrough; †Scotch foundry iron; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 15s 0d ($3.64) f. o. b. Ferromanganese £21 13s, 0d ($105.00) delivered Atlantic seaboard, duty-paid. German ferromanganese £15 0s 0d ($72.75) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel; French, Belgian, Luxemburg, and German are for basic-bessemer steel.

and business generally is calm. For certain orders concessions are made by a few works, but prices generally are firm, as most works are well booked. New troubles in China have had the effect of reducing the volume of demand from that market. The semi-finished steel market continues to be very narrow, and billets are hardly obtainable in France and Belgium at as high a price as £5 6s ($25.70) and even £5 7s ($26). Certain sizes of merchant bars are now to be had for £6 2s ($29.60). Beams are firmer in Belgium, not that the demand has increased to any great extent, but because the makers are deliberately increasing their quotations, which now average £5 2s 6d ($24.90), which is 3s 6d (85c) less than the price of billets. The demand for plates is well maintained, and the price of ¼-inch plates is about £6 6s ($30.50). Pig iron is hard to buy in Belgium, except at rates above those fixed by the syndicate. The base price for foundry pig iron now is £3 10s ($17) f.o.b. Antwerp. Similar conditions apply in France to those that prevail in Belgium.

In Germany export business remains steady. No orders for bars are accepted at less than £6 3s 9d ($29.90). Hoop makers are selling at rather more than the official quotation of £6 7s 6d ($30.90). Channels, American sections, have been reported as selling to the United Staes at £6 1s ($29.40). Japanese buyers are paying 1s (24c) extra for wire rods for end of May delivery. In Italy there has been a brisk demand for British Middlesbrough pig iron, and a substantial tonnage of East Coast hematite has been contracted.

France Makes Less Steel

Paris, April 11.—(*European Staff Service*)—A considerable drop occurred in the production of pig iron and steel in France during February compared with January. The February pig iron output included 615,000 tons of basic bessemer, 85,000 tons of phosphorus foundry, 14,000 tons of semiphosphorus, 28,000 tons of hematite foundry, 26,000 tons of hematite forge pig iron, and 13,000 tons of ferro-alloys. The February steel output was composed of 724,000 tons of steel ingots and 14,000 tons of steel castings. From the point of view of process, the February output included 502,000 tons of basic bessemer, 219,000 tons of open hearth, 10,000 tons of electric, 5300 tons of acid bessemer and 1700 tons of crucible steel. The following table gives comparisons in metric tons:

Metric tons

Mon. ave.	Act. Fur. on last day	Pig iron	Steel ingots and castings
1913	131	433,940	390,580
1926	155	785,965	702,500
1927	142	774,785	689,610
1928	153	841,415	782,995
1929			
Jan.	157	905,000	838,000
Feb.	157	781,000	738,000

British Prices Lower

London, April 12.—(*European Staff Service*)—Board of trade returns for February give the average British export prices per gross ton for a certain number of iron and steel products. These prices are compiled from actual contracts made several months ago, and this accounts for the difference between these quotations and the base prices regularly quoted in our columns.

Compared with those of the preceding month, prices in February this year were lower for every commodity mentioned except plates. In comparison with those of a year ago, prices were lower for each commodity. Figures follow:

	£	s	d	$
Foundry pig iron	3	17	5	18.73
Beams	8	8	2	40.76
Rails	8	12	0	41.68
Plates	9	8	8	45.73
Black sheets under ⅛-inch thick	11	18	0	57.67
Galvanized sheets	15	4	5	73.81
Tinplates	19	9	11	89.68

Renew Rail Agreement

London, April 12.—(*European Staff Service*)—The agreement reached at the last meeting of the European rail makers' association is effective as from April 1. The principal resolution arrived at is that the association is renewed for a period of six years. No change has been made in the quotas of the various participating countries, but it has been agreed that India and the crown colonies now will be included in the British home market, with the result that the British quota will not apply to those markets.

The fine for exceeding the quota has been fixed at 10s per ton up to an excess of 37,500 tons, and £1 per ton for any further excess. Penalties for orders taken irregularly will be £1 per ton. These fines and penalties will be settled every 18 months.

Germany has made a reservation according to which that country may retire from the association if the German domestic cartels are not renewed at the time of their expiration, which is May 1, 1931.

It is reported that the United States has joined the association as an active member.

French Steel Market Is Steady; Speculation Reaction Is Feared

Office of IRON TRADE REVIEW,
9 Rue de Londres

Franc—3.91c

PARIS, April 12.—(*European Staff Service*)—Special attention is directed in France to the financial sitsituation of the various countries of Europe, and one fears that the excess of speculation in the share markets for a long time will have a direct influence on general conditions. Doubtless the big profits that have been made on share speculation have helped to buy many commodities, but now it is easily realized that the revenues on the shares represent a low percentage, and specialists of the Paris stock exchange think this situation will prevent people from further buying on a large scale. This situation, if it arises, would react on the commodity markets.

The increase of the discount rate is general all over the world, and if France does not change its own, it would not be surprising if the bank authorities eventually decide to follow the lead. This usually is followed by economic difficulties. Apart from such prophecies, the steel market is satisfactory, and the industry is hampered only by a scarcity of workers. The prices quoted are profitable, but conservative sections of the trade are trying to refrain the tendency toward increasing prices, although many factors justify a further increase. Prices of fuel have been increased 3 to 5 francs a ton, and the new tax on coal will constitute a heavy charge for industry.

The pig iron market is steady and contracts are regularly specified. The scarcity of semifinished products is not as serious as some weeks ago, and transformers can obtain some tonnage. The fact that the new prices are not yet applied is a sign of easiness. The comptoir of A-products probably will be reconstituted, and meetings are being held to fix the conditions of its renewal.

Some orders for rolled material have been accepted. Works have not as large tonnage on their books as previously. Prices are firm at 740 to 760 francs ($28.85 to $29.50) per ton in the east. The plate and sheet market is unchanged. The wire products department is satisfactory. Wire nails are sold at 1250 to 1300 francs ($48.75 to $50.75). The scrap market is active and demand exceeds the supply; this helps to strengthen prices.

Belgium Output Falls

Brussels, April 11.—(*European Staff Service*)—Output of pig iron, steel ingots and castings in Belgium during February fell well below the record figure of January. In February the output of steel ingots and castings included 293,840 tons of steel ingots and 8180 tons of steel castings. The following table gives comparisons in metric tons:

Mon. ave.	Coke	Act. Furn.	Pig iron	Steel ingots and castings	Finished steel
1913	294,000	....	207,055	205,550	154,920
1926	413,000	....	283,270	281,160	231,810
1927	448,880	....	312,620	309,040	255,185
1928	493,885	....	325,445	327,870	281,125
1929					
Jan.	513,550	56	350,680	357,010	313,000
Feb.	458,740	55	302,320	302,020	266,790

German Production Less

Berlin, April 11.—(*European Staff Service*)—Output of pig iron in Germany during February fell to 981,695 tons. The February output included 609,249 tons of basic bessemer, 225,047 tons of ferro-alloys, 74,085 tons of foundry, 70,195 tons of hematite, 1639 tons of direct castings, and 1480 tons of gray forge pig iron. February output of ingots and castings was composed of 1,249,407 tons of steel ingots and 20,467 tons of steel castings. The ingot production included

646,543 tons of basic open-hearth, 572,546 tons of basic bessemer, 14,992 tons of acid open-hearth, 11,930 tons of crucible and electric steel, and 3396 tons of ingot iron. The following table gives comparisons in metric tons:

Metric tons

Mon. ave.	Furnace on last day	Pig iron	Steel ingots and casting	Finished steel
†1913	.....	909,640	993,640	970,240
1926	*109	803,625	1,028,470	856,340
1927	*116	1,091,875	1,359,225	1,069,930
1928	*101	984,700	1,209,770	963,550
1929				
Jan.	97	1,097,980	1,469,653	1,001,824
Feb.	96	981,695	1,269,874	864,801

†Present boundaries.
*Last day of year.

More Stokers Are Sold

Washington, April 23.—March sales of mechanical stokers gained moderately over those of February and were the best for any month since September, but fell slightly under March, 1928, as the following comparison by the department of commerce shows:

	Stokers sold	Fire tube boilers	Water tube boilers
1928			
January	75	20	55
February	85	26	59
March	117	42	75
Total (3 mos.)	283	77	206
April	88	21	67
May	130	43	87
June	162	78	84
July	186	67	119
August	162	57	105
September	161	68	93
October	100	48	52
November	116	54	62
December	102	34	68
Total (year)	1,490	547	943
1929			
January	97	36	61
February	80	26	54
Total (3 mos.)	294	104	190

Davison Coke & Iron Co. Leases Cherry Valley and Claire Stacks

PITTSBURGH, April 23.—The Davison Coke & Iron Co. practically has obtained control of the merchant pig iron industry in the valley district through the signing of long-term leases for the Cherry Valley blast furnace plant of the Hanna Furnace Co. at Leetonia, O. and the Claire blast furnace of the Reliance Coke & Iron Co., Sharpsville, Pa. The Davidson company at present operates a furnace at Sharpsville, Pa., and expects to place its Neville Island stack in blast the latter part of May. These four furnaces have a daily capacity of 2100 tons of pig iron.

W. P. Snyder Jr., president of the Shenango Furnace Co., which operates two furnaces at Sharpsville, Pa., is a director of the Davison Coke & Iron Co. and the Shenango company is financially interested in the latter organization. Control or close working arrangements with all but one valley merchant furnace now in operation, Struthers Furnace Co. with blast furnace at Struthers, O., has been obtained by Davison.

George Johnson, resident manager in charge of sales for the Hanna company, and W. S. Scott, in charge of sales for the Reliance Coke & Iron Co., will join the Davison company in the sale of pig iron under the direction of George D. Buckwell, sales manager for the Davison Coke & Iron Co. Operations will be in charge of A. M. Kennedy, works manager.

This move by the companies concerned is expected to have considerable influence in stabilizing the valley pig iron market, although activity of two steel companies in sale of iron in the district is not restricted. Important economies will be effected at the Neville Island plant of the Davison company when the various units now under construction are placed in operation. Cement, by-product coke and pig iron will be produced. The cement kilns and blast furnace are scheduled for operation in May. The cement plant, equipped to use either powdered coal or gas as fuel, will have an annual capacity of 1,250,000 barrels.

An order recently was placed with the Koppers Co., Pittsburgh, for a new battery of 35 coke ovens, which will double the original capacity planned, providing 1425 tons daily. Both batteries are expected to be ready for firing late this year. This will provide additional coke supplies for use by other furnaces of the group. At the same time it will further restrict the Connellsville beehive coke trade. Use will be made of river transportation in moving materials to and from the island plant, and the utilization of coke oven gas and blast furnace slag and gas will provide additional economies. Ore will be brought in over the Pittsburgh & Ohio Valley railroad, a subsidiary, which connects Neville Island with large lines entering this district. The Basic Barge Line, another subsidiary, operates a fleet of steel river barges.

It was announced a short time ago that the Davison company was considering erection of a second blast furnace on Neville Island, but early action is not planned. The existing stack was built in 1900 by the American Steel & Wire Co., later leased to the Carnegie Steel Co., and last year sold to the Davison Coke & Iron Co. The furnace now is being remodeled and will have a daily capacity of 650 gross tons of pig iron. The ultimate total investment in the Neville Island project and the Sharpsville, Pa., plant, it is estimated, will be more than $12,000,000. George S. Davison is president of the company, Allen S. Davison is vice president and treasurer, and Albert P. Meyer is vice president and secretary.

Convention Calendar

April 24-25—American Welding society. Annual meeting at Engineering Societies building, New York. M. M. Kelly, 33 West Thirty-ninth street, is secretary.

April 24-25—National Metal Trades association. Annual convention at Drake hotel, Chicago. J. E. Nyhan, Peoples Gas building, Chicago, is secretary.

April 29-May 3—Chamber of Commerce of the United States. Annual meeting at Chamber of Commerce building, Washington. D. A. Skinner, 1615 H street, N. W., is secretary.

May 1-2—Taylor society. Spring meeting at Hotel Selwyn, Charlotte, N. C. H. S. Person, 29 West Thirty-ninth street, is managing director.

May 1-3—American Society of Mechanical Engineers. National management and materials handling meeting at Book-Cadillac hotel, Detroit. Calvin W. Rice, 29 West Thirty-ninth street, New York, is secretary.

May 6-10—American Management association. Annual spring convention at Hotel Pennsylvania, New York. W. J. Donald, 20 Vesey street, New York, is managing director.

May 7-9—American Supply and Machinery Manufacturers' association. Annual convention at Ambassador hotel, Atlantic City, N. J. R. Kennedy Hanson, 717 Clark building, Pittsburgh, is secretary.

May 7-9—National Supply and Machinery Distributors' association. Annual convention at Ambassador hotel, Atlantic City, N. J. George A. Fernley, 505 Arch street, Philadelphia, is secretary.

May 7-9—Southern Supply and Machinery Dealers' association. Annual convention at Ambassador hotel, Atlantic City, N .J. Alvin M. Smith, Smith-Courtney Co., Richmond, Va., is secretary.

May 13-16—American Society of Mechanical Engineers. Spring meeting at Sagamore hotel, Rochester, N. Y. Calvin W. Rice, 29 West Thirty-ninth street, New York, is secretary.

May 16-17—National Hardware Association of the United States. Eighteenth annual meeting of metal branch at Hotel Statler, Detroit. George A. Fernley, 505 Arch street, Philadelphia, is secretary.

May 16-18—American Gear Manufacturers' association. Annual meeting at Hotel Statler, Cleveland. T. W. Owen, 3608 Euclid avenue, Cleveland, is secretary.

May 21-22—American Refractories institute. Annual meeting at French Lick Springs hotel, French Lick, Ind. Dorothy A. Texter, 2202 Oliver building, Pittsburgh, is secretary.

May 21-23—American Steel and Heavy Hardware association. Twentieth annual convention at Hotel Washington, Washington. B. R. Sackett, 503 Arch street, Philadelphia, is secretary.

May 24—American Iron and Steel institute. Annual spring meeting at Hotel Commodore, New York. E. A. S. Clarke, 75 West street, New York, is secretary.

May 27-28—Associated Machine Tool Dealers. Annual spring meeting at Granville Inn, Granville, O. E. P. Essley, 551 West Washington boulevard, Chicago, is secretary.

May 27-29—American Electrochemical society. Spring meeting at University of Toronto, Toronto, Ont. Dr. Colin G. Fink, Columbia university, New York, is secretary.

Machinery

Sales Show Some Improvement but Level Not Up to Recent Weeks—Extended Deliveries Continue to Cause Trouble for Dealers

SOME slight improvement is to be noted in machine tool and shop equipment buying over last week, although in general the level is not up to that of recent weeks. Purchases by the automotive trade have slowed down markedly, but during the last few days better orders have originated from this source. General manufacturing continues at a high rate for orders from this field make up the bulk of the going business. Deliveries have been causing dealers considerable trouble, but in some cases this condition is easing up. For the most part, however, factories can do no better than two to three months delivery. Dealers say no business is lost from this situation. One manufacturer of milling machines has increased prices on some sizes about 12½ per cent.

New York, April 23.—Machine tool buying continues brisk. Eclipse Engine Co., East Orange, N. J., has closed on further equipment, including eight grinders placed with a Cincinnati builder and 12 or 13 turret lathes. Otis Elevator Co., Yonkers, N. Y., has placed one or two turret lathes, but whether the equipment is for domestic use or for shipment to Australia has not been clearly established.

While not buying on anything like the scale of a few weeks ago, General Electric Co., Schenectady, N. Y., has placed a few machines for Schenectady and Pittsfield, Mass. New York, New Haven & Hartford recently has closed on turret lathes for its Van Nest shops, and New York Central is inquiring for a turret lathe for Buffalo and another for a point farther west. Intertype Co., Brooklyn, is understood to have now closed on practically all of its sizable list, noted a few weeks ago.

A Milwaukee manufacturer of milling machines has advanced prices on certain sizes about 12½ per cent. While there is talk of advances in other quarters, no further revisions have been noted.

Worcester, Mass., April 23.—While inquiry for machine tools holds well, there has been some slight recession in sales. Backlogs are heavy and equipment makers continue operating at capacity on six to seven weeks delivery for some units. New business is largely confined to small groups of tools and the total is well ahead of the corresponding period last year. Small tool shipments are heavy. Used tools of the better type move readily.

Pittsburgh, April 23.—Machine tool sellers generally report a satisfactory market both as regards awards and inquiry. Deliveries of manufacturers are extended in a number of instances and some trouble is arising from this score. Although most orders consist only of a few tools at a time, an occasional large job is received. Parts of two railroad lists still are pending, and a large number of tools remain on the second quarter list of the Westinghouse Electric & Mfg. Co. Considerable business still is pending in the crane market.

Cleveland, April 23.—Orders for equipment have expanded somewhat during the week just past, but the level still is below that which has prevailed for several weeks. Renewed activity of the automotive industry is responsible for this improvement. The bulk of trade, however, is coming from general lines of manufacturing. Dealers still are confronted with deliveries ranging from one to three months, but report no business is lost for this reason. In a few cases deliveries have eased a little. Tool manufacturing plants in this territory are operating on night schedules to maintain production.

Chicago, April 23.—Machine tool buying volume is satisfactory despite the fact that several distributors in this district report a slight falling off in sales in some lines, and a slight contracting in fresh inquiry. All dealers have good orders pending and billings are high. Lathes and shapers have been active, one industrial buyer in the Chicago district taking four shapers. Sales of open-side planers have been numerous in the past several months and some manufacturers are booked up a year ahead. Automotive accessory plants in the Chicago district have been good buyers until recently. Foundries and forge shops have been submitting orders steadily, as well as sheet metal working plants. Most dealers report present activity equivalent to the average rate for the first quarter. The delivery situation is showing no improvement. Cancellations in orders are reported occasionally when disappointed buyers are unable to get shipping accommodations desired, but on the whole buyers realize that all manufacturers and distributors are in virtually the same position as regards unfilled orders. Reports of price advances continue to be heard. One lathe manufacturer has advanced slightly prices on one line of his equipment.

CRANE ORDERS PLACED

Crane equipment for a terminal to be built in Baltimore for Western Maryland Railway Co., to Wellman-Seaver-Morgan Co.; this equipment cost $103,125.

Two crawler cranes, including one 10-ton and one 15-ton, for Baltimore & Ohio railroad; placed with unnamed builder.

Two 10-ton electric bucket cranes for American Smelting & Refining Co., Maurer, N. J., to Maine Electric Co.

Among single orders were: 5-ton electric charging machine for General Steel Castings Co., Baldwin, Pa., to Morgan Engineering Co.; 10-ton electric crane for John J. Cavagnaro, Harrison, N. J., to unnamed builder; 5-ton overhead electric crane for foundry of Electro Alloys Co., Elyria, O., to Toledo Crane Co.

CRANE ORDERS PENDING

60-ton electric overhead crane for General Electric Co., Schenectady, N. Y., for Pittsfield, Mass.; early action expected.

Crane Sales at Record

New York, April 23.—Electric overhead crane orders in March were the heaviest in many months, amounting to $1,918,720.40. This compares with $1,172,850.60 in February and $1,383,257.70 in January. The cranes sold numbered 199, with a total tonnage capacity of 3128½. In February 149 cranes, with a total capacity of 2070¼ tons, were placed and in January 173 cranes, with 1948 tons total capacity.

Unfilled bookings at the end of the month also were the heaviest in considerable time, amounting to $4,300,320.90. This compares with $3,284,848.50 in February and $2,547,166.50. March unfilled bookings involved 438 cranes, with a total capacity of 7105 tons.

Shipments involved 113 cranes, with a total capacity of 1311¼ tons and a total valuation of $772,609.10. In February shipments amounted to $585,986.10 and in January $851,514.34.

Hoist Buying Declines

New York, April 23.—A Decrease in electric hoist business in March is indicated by a statement issued by the Electric Hoist Manufacturers associaton, 165 Broadway. The number of hoists ordered declined 20.66 per cent from the preceding month and the value 176,883 per cent. Shipments were 22.8118 per cent larger.

Plans Mill Improvements

Johnstown, Pa., April 23.—Bethlehem Steel Co. plans to install 24 modern soaking pits at its 48-inch blooming mills at the lower works in place of the present 9. Electric drive will supplant steam drive on certain 9-inch mills. New blowing engines will be installed at three blast furnaces and new boilers at the Franklin blast furnaces.

Virginia Reports Net

Virginia Iron, Coal & Coke Co., Roanoke, Va., reports a net profit of $33,048.15 for the first quarter. Gross operating revenue was $668,632.98 and the total net revenue was $96,036.15, according to John B. Newton, president.

CONSTRUCTION and ENTERPRISE

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East Central

BLUE ISLAND, ILL.—Western Pipe & Steel Co. has awarded the contract for the steel work on its plant addition to the Wisconsin Bridge & Iron Co., Milwaukee. (Noted Jan. 31.)

CHICAGO—University of Chicago has awarded contract for the construction of a 4-story laboratory to Leonard Construction Co., 37 South Wabash avenue, Chicago.

CHICAGO—Flexible Reamer Corp. is planning the construction of a 3-story plant addition. Guske & Foster, 3725 Devon avenue, are architects.

CHICAGO—American Co., 104 South Michigan avenue, is planning to construct a 1-story plant addition, on Sheridan road, east of Fourteenth street, in North Chicago.

DECATUR, ILL.—Decatur Brass & Aluminum Foundry Co. has moved to the plant of the former Halliday Co., Decatur, where it will install a new half-ton electric furnace and other equipment incident to its entry in the iron and semisteel castings fields, according to Fred Smith, president.

ELGIN, ILL.—City plans to purchase pumps, etc., for proposed waterworks improvements.

GENEVA, ILL.—Burgess-Norton Co., manufacturer of hardware specialties, 201 Richards avenue, is planning the construction of a plant addition, 1-story and basement, 50 x 100 feet.

PEORIA ILL.—Caterpillar Tractor Co. will soon begin work on plant additions, consisting of a main assembling and production unit, 475 x 1200 feet, with a gray iron foundry adjoining. (Noted April 4.)

ANDERSON, IND.—Van Loon Pattern Works is rapidly completing its new plant building. (Noted Feb. 7.)

ANDERSON, IND.—Reliable Machine Co., 815 Jackson street, is planning the construction of a plant addition, consisting of a garage and machine shop. The building contemplated is to be 1-story, 72 x 200 feet.

ELKHART, IND.—Time-O-Stat Control Corp., with general offices at 147 Broadway, Milwaukee, is making rapid progress on construction of its plant addition here, and expects to have it completed by May 1.

INDIANAPOLIS—L. S. Guetti Tool Co., 111 North New Jersey street, recently formed, has taken a five year lease at the above address, and will start immediate production of tools and gages.

INDIANAPOLIS—Indiana Blind School, 40 East North road, is in the market for power plant equipment, including boilers, deep well pumps, stokers, etc., for dormitory buildings at Seventy-fifth and College streets.

MARISSA, ILL.—William Jones, president of Westville, Ill., has awarded contract for construction of complete waterworks system for Marissa, to Troy & Doty, Albion, Ill.

MICHIGAN CITY, IND.—Sullivan Machinery Co., Chicago, has awarded the contract for construction of its plant addition here to the Worden-Allen Co., Milwaukee. Contract calls for the work to be completed within ninety days.

BAY CITY, MICH.—Bay City Shovels Inc. has awarded contract for construction of plant addition to H. C. Webber Construction Co. Equipment will include a 10-ton electric traveling crane.

BRIDGMAN, MICH.—Mathieu & Sons Foundry Co. plans to construct a 1-story plant addition, 60 x 240 feet, with equipment.

DETROIT—Richard Bros. Die Works, 4646 Lawton avenue, has awarded the contract for a 1-story plant addition, 95 x 205 feet, to the Austin Co., General Motors building.

DETROIT—Liberty Starter Co., Minnie and West Fort street, is planning an addition. Pollmar & Ropes, architects, 2539 Woodward avenue, are taking figures. (Noted Oct. 25.)

DETROIT—Ex-Cell-O Tool & Mfg. Co., 1469 East Grand boulevard, has almost completed its new plant addition. (Noted Feb. 7.)

DETROIT—Mack-craft Amphibian Corp. will acquire facilities here for the manufacture of transport cruisers, R. U. McIntosh, president and general manager, states. Plans are to construct at least two models in temporary quarters at once, and to go into production as soon as a plant can be built and equipped. Temporary offices are located at Hotel Tuller, 121 Adams avenue, west.

PONTIAC, MICH.—Hancock Iron Works, 52 West Pike street, is having plans prepared for a 1-story plant addition, 100 x 500 feet.

RIVER ROUGE, MICH.—Detroit Wax Paper Co., 547 Harper avenue, Detroit, is having plans prepared for a 1-story plant 210 x 600 feet, on Pleasant avenue. Estimated cost $600,000. Electric motors, etc. will be required.

CLEVELAND—Continental Carbon Co., 13904 Lorain avenue, has awarded contract to rebuild fire damaged buildings at its plant, to the Gilchrist Construction Co.

CLEVELAND—Cream Cone Machine Co., J. W. Taylor president, 1874 East Fifty-ninth street, is planning to construct a 3 or 4-story addition, 57 x 65 feet.

CLEVELAND—Union Cap Screw Co., 13605 Union avenue, announces it has started construction of a new plant addition. Immediately upon completion, the building will be equipped with machinery, now being placed on order.

CLEVELAND—Precision Castings Co., of Syracuse, N. Y., which has recently completed a plant at 12600 Berea road, Cleveland, will probably construct an addition within sixty days according to J. R. Millspaugh, district representative.

CLEVELAND—F. B. Chandler, president and founder of the Chandler Motor Co., will establish a chromium plating works in the Pennsylvania warehouse, at Cedar avenue and Ashland road. The plant will do plating for the Cleveland branch of the Hupp Motor Car Corp. and for several other manufacturers.

CLEVELAND—Cutter Sheet Metal Co., 2701 St. Clair avenue, has purchased property 44 x

Resale Equipment News

MURRAY BODY CORP., Detroit, through the Norton Realty Co., Racine, Wis., will offer for sale at public auction May 6 in Memorial hall, Racine, all of the property known as the H. & M. Body Corp., valued at $590,000, at Racine. The plant originally was built by the former Racine Mfg. Co. to build wagons and carriages and later automobile bodies. It was then acquired jointly by the Hupp Motor Car Co., Detroit, and the Mitchell Motors Co., Racine, to supply closed car bodies. When the Mitchell company became defunct, the Hupp company contracted with the Murray company for its bodies, selling the H. & M. plant at Racine to that interest. After a few months of operation, the Murray Corp. closed the Racine plant and it has been idle for several years.

* * *

Daniel M. Rothschild, secretary, Thomas Brass & Iron Co., Waukegan, Ill., has called a special meeting of stockholders for April 30 at 1424-1426 First Wisconsin National Bank Building, law offices of Lamfrom, Tighe, Engelhard & Peck, Milwaukee, to consider resolutions authorizing the sale of all or any part of the company's real estate within the city of Waukegan.

Sales Calendar

May 2—Auction of metals and other navy surplus at navy yard, Norfolk. Va.

May 6—Sale at auction at Racine, Wis., of property of H. & M Body Corp.

195 feet at 4408 St. Clair avenue, where its new plant is under construction. It does sheet metal contracting, and manufactures machine safety guards, radiator enclosures and other metal equipment.

CLEVELAND—Austin Co. has bought 100 x 369 feet adjoining the Geometric Stamping Co.'s new plant at St. Clair and East 200th street, and added it to the 7-acre site leased to the Geometric Holding Co. The $500,000 plant is well under way, steel work having been started. (Noted Feb. 21.)

COLUMBUS, O.—Directors of Hocking Valley railroad, with purchasing department here, have authorized the expenditure of $6,000,000 for coal and ore handling machines and other facilities at Presque Isle, O. Two new coal-loading machines of 12,000,000 tons capacity will be installed, also an ore-handling machine of 600,000 tons capacity. Provision has been made for a grain elevator when the conditions warrant.

COSHOCTON, O.—Coshocton Iron Works is planning to start construction immediately on a foundry, according to J. S. Skelly, president.

DAYTON, O.—National Foundry Co. has awarded the contract for a 1-story plant addition to A. W. Kimmel Co., Dayton. With equipment it will cost about $25,000.

GENEVA, O.—American Fork & Hoe Co., G. B. Durell president, B. F. Keith building, Cleveland, has awarded contract for a plant addition, 40 x 100 feet.

LIMA, O.—Myers Machine & Tool Co., of Detroit, manufacturer of tools and dies, will locate here and take over the former plant of the Lima Castings Co. Three buildings will be remodeled at a cost of $40,000. Louis Myers, Detroit, is president.

SPRINGFIELD, O.—American Seeding Machine Co., recently absorbed by the Oliver Farm Equipment Co., South Bend, Ind., through the exchange of stock, will probably enlarge plant here.

HUNTINGTON, W. VA.—Expansion plans of the Armstrong Electric & Mfg. Co. were announced by Col. R. Potter Campbell, chairman of the board of directors of the Armstrong company.

NEWELL, W. VA.—Homer-Laughlin China Co. has awarded contract to the H. K. Ferguson Co., Cleveland, for the construction of a plant here. The building with equipment will cost about $1,500,000 according to F. B. Lawrence, chairman of the building committee. A large amount of production and handling equipment will be installed. (Noted April 11.)

MILWAUKEE—Allis-Chalmers Mfg. Co. is constructing additional plant units for tractor production and a heat treating plant here.

MILWAUKEE—Hamilton Aero Mfg. Co., Bremen street and Concordia avenue, manufacturer of metal and wood propellers, is installing new equipment costing $100,000 and has decided to purchase additional equipment of the same amount. (Noted Jan. 10.)

North Atlantic

BRIDGEPORT, CONN.—Bridgeport Brass Co., R. Day general manager, has awarded the construction of a 1-story plant addition, 75 x 200 feet, to the Hewlett Co., 886 Main street.

MERIDEN, CONN.—An addition to the plant of the New Departure Mfg. Co. here will be started at once, according to announcement. The new building will be 80 x 240 feet and 5-stories high. A part of the building will be devoted to a modern heat treating plant for ball bearings.

NEW BRITAIN, CONN.—Acorn Bearing Co. has started construction on a new 1-story plant addition, 45 x 85 feet.

NEW BRITAIN, CONN.—New Britain Tool Mfg. Co. will start at once on construction of plant addition.

WINSTED, CONN.—Strand & Sweet Mfg. Corp. has been bought by the Polymet Mfg. Corp., New York. The former is a manufacturer of fine copper wire. The Strand & Sweet plant will be enlarged, and will continue to do a merchant business in the surplus not required by the Polymet corporation. The latter recently took over the Coilton Electric Mfg. Co. of Easton, Pa. This plant is also being expanded.

BOSTON—Boston & Maine railroad is planning construction of a modern locomotive terminal in its Boston yards. A large coaling station will also be constructed, equipped with automatic hoisting machinery. With the terminal will be connected a new power house, machine shop, and new water, sand, and boiler washing facilities.

EVERETT, MASS.—H. K. Porter Inc., 6 Ashland street, manufacturer of bolt clippers, is planning a 1-story addition, 85 x 125 feet. J. R. Worcester Co., 79 Milk street, Boston, is the engineer.

FITCHBURG, MASS.—L. H. Goodnow Foundry Co. recently was damaged by fire. New equipment will probably be purchased.

WRENTHAM, MASS.—Winter Bros. Co., Kendrick street, manufacturer of taps and dies, announces it has awarded the contract for one of three plant additions to Samuel Steeves, Wrentham.

HOLLAND, N. J.—Contract for the construction of a steam power plant here has been awarded by Associated Gas & Electric Co., 61 Broadway, New York, to W. S. Barstow Engineering Co., 50 Pine street, New York. Engineers are taking bids on equipment, etc.

BINGHAMTON, N. Y.—International Business Machines Corp. is having plans prepared for the construction of a plant addition here, according to Thomas J. Watson, president.

BINGHAMPTON, N. Y.—Binghampton Gas Works, subsidiary of American Light & Traction Co., will spend $115,000 this year for a new pump house and distribution system in Binghamton, Johnson City, Endicott and other suburbs.

BUFFALO—Weed & Co., iron and steel jobber and supply dealer, recently suffered severe damage to its warehouse by fire.

BUFFALO—Borst Engineering Co., recently incorporated here with a capital of $150,000, will lease a local factory building and begin production of a new type automobile cushion shackle. Production is planned on a large scale. Andrew J. Borst is president.

MT. VERNON, N. Y.—Molded Insulation Co., which recently acquired the Consolidated Instrument of America Inc., has started construction of plant addition which will triple its capacity.

NEW YORK—Delaware, Lackawanna & Western railroad, 90 West street, is making inquiries for machine tools.

ROCHESTER, N. Y.—State of New York appropriated $850,000 for the construction of a power house at Rochester State hospital.

BRISTOL, PA.—Keystone Aircraft Corp. has awarded the contract for a 1-story plant addition to Airport Development & Construction Co., Mitten building, Philadelphia.

BUTLER PA.—Luria Bros. & Co., Reading, Pa., scrap iron dealers, have purchased a 5-acre tract of land at East Butler. The company plans to erect a large warehouse and install machinery for the conversion of scrap iron into shape for shipment to reconditioning plants.

EAST BRADFORD, PA.—Midwest Air Filters Inc. is erecting an addition to its plant, 30 x 120 feet, for increased manufacturing facilities.

MIDDLETOWN, PA.—Power plant to cost $100,000 is to be built for the Odd Fellows Home of Pennsylvania here. William H. Lee, of this city, is architect.

PHILADELPHIA—Hydraulic Tool Works, D street, north of Erie, has been granted permit for plant alterations.

PHILADELPHIA—Pennsylvania railroad awarded contract for power house, 100 x 118 feet, at Thirty-third and Market street, to United Engineers & Construction Co., 112 North Broad street.

POTTSTOWN, PA.—Spicer Mfg. Co., Keim street, manufacturer of universal joints, shafts and drop forgings, has awarded contract for 1-story plant addition to F. H. Keiser Co., 128 East Fourth street.

Western States

EL CENTRO, CALIF.—Imperial Irrigation District plans to vote on $2,000,000 bond issue for the construction of a hydroelectric power plant.

HUNTINGTON PARK, CALIF.—Ensign Carburetor Co., 217 East seventeenth street, Los Angeles, has awarded contract for a plant addition, to Hamm, Grant & Bruner, 607 Ferguson building, Los Angeles.

LONG BEACH, CALIF.—Construction is now underway at the Long Beach generating plant of the Southern California Edison Co. of a second 134,000-horsepower generating unit to be completed early next year and to cost about $7,000,000. (Noted Jan. 17.)

LOS ANGELES—Kinner Airplane & Motor Corp. has decided on a financing plan to enable the company to handle orders. Plant enlargement will be necessary to fill these, and expand

the company's activities, according to W. B. Kinner, president.

CALHAN, COLO.—This city, Glenn E. Courter clerk, has opened bids for the construction of a pump house, reservoir, and installation of machinery and equipment. Weiland Engineering Co., 725 Thatcher building, Pueblo, Colo., is consulting engineer.

EUGENE, OREG.—City plans an election about June 1, to vote on $1,250,000 bond issue for construction of Leaburg hydroelectric plant. W. C. Club is city engineer.

PALOUSE, WASH.—Power equipment will be installed in proposed new pulp mill, to be constructed on local site by A. L. Maxwell and associates.

RENTON, WASH.—Puget Sound Power & Light Co., A. W. Leonard president, Stuart building, Seattle, plans the construction of the second unit of Shuffleton steam power plant on Lake Washington near here, to increase capacity from 50,000 to 100,000 horsepower. Estimated cost is $2,500,000. Structure will house three boilers and three turbines of 50,000 horsepower. Work will be done under the supervision of W. D. Shannon, chief engineer. Contract for oil breakers has been awarded. (Noted Feb. 28.)

FT. OSBORNE, MAN.—Department of public works, Parliament building, Ottawa, Ont., plans the construction of a power plant at barracks here.

MANITOBA, MAN.—Emerson-Churchill Colonization railroad has petitioned the Manitoba legislature for authority to construct a railroad from Emerson, Man., to Fort Churchill, on Hudson Bay, about 1000 miles. The petition also asks for the right to construct elevators, warehouses, wharves and terminals at Fort Churchill.

BRANDON, MAN.—A. P. McDiarmid Co. proposes to rebuild its factory here recently damaged by fire with a loss of $80,000.

BRANTFORD, ONT.—Plans are being prepared by the city council for a mechanical filtration plant to cost $400,000. Waterworks engineer is Norman R. Wilson. City engineer is F. P. Adams.

COPPER CLIFF, ONT.—International Nickel Co., 67 Wall street, New York, and Consolidated Mining & Smelting Co., Pacific building, Toronto, Ont., will build a copper refinery with 120,000 tons annual production here. Estimated cost $4,000,000. (Noted April 11.)

CORNWALL, ONT.—The Howard Smith Paper Mills Ltd. will build a boiler house here to cost $20,000, for which contract has been let to the Deakin Construction Co. Ltd., 698 St. Catharine street west, Montreal, Que.

DOLBEAU, QUE.—Lake St. John Power & Paper Co. will start work at once on a lock on the Mistissimi river here, to cost $1,000,000. The work is being done by the owners and the Leaside Co. Ltd., Leaside, Ont.

GUELPH, ONT.—Guelph Stove Co. will proceed immediately with the erection of a $250,000 addition to its plant here. The Guelph company is operated by the T. Eaton Co., Ltd., 190 Yonge street, Toronto, Ont.

HARROW, ONT.—W. Clark Ltd. is having plans prepared for a 3-story building, 50 x 100 feet, canning plant including boiler house. Equipment will be required.

HIGH FALLS, QUE.—MacLaren Fir Co., Buckingham, Que., has started work on a $15,000,000 power development project on the Lievre river here. R. D. Ferguson, New York, is engineer. General contractor is W. I. Bishop Ltd., 10 Cathcart street, Montreal, Que. Structural steel has been let to Dominion Bridge Co. Ltd., Lachine, Que. (Noted March 7.)

MUSQUASH RIVER, ONT.—Hydroelectric Power Commission of Ontario, 190 University avenue, Toronto, Ont., is having plans prepared for a $6,000,000 power development plant here.

STRATFORD, ONT.—The Stratford Flying Club proposes to build an airplane factory here to cost $40,000. John Murray, Downie street, is interested.

SUDBURY, ONT.—Bids will be received until April 30 for the erection of a $300,000 engine house here for the Canadian Pacific Railway Co. Purchasing agent is J. M. Sullivan, Sudbury.

Southern States

MOBILE, ALA.—City plans to vote on $1,000,000 bond issue for proposed electric power plant as operating unit of water works system. Burns & McDonnell Engineering Co., 402 Interstate building, Kansas City, Mo., are consulting engineers.

JACKSONVILLE, FLA.—Curtiss Flying Service, Garden City, Long Island, N. Y., subsidiary of Curtiss Aero & Motor Co., is contemplating establishing a flying station and shops for complete repairs.

ATLANTA, GA.—Southern Air Transport Inc., Thomas Hardin vice president and general manager, Ft. Worth, Tex., plans the construction of hangars, shops and general plant for distributing airplanes and accessories at Candler field.

ROME, GA.—Rome Stove & Range Co. has awarded contract for plant addition to Eagle Iron Works, Birmingham, Ala.

PROVIDENCE, KY.—City plans $50,000 filtration plant. Wynkoop Kiersted, 614 Interstate building, Kansas City, Mo., is consulting engineer.

NEW ORLEANS—Koretke Brass & Mfg. Co., 922 Magazine street, is planning to start immediate construction on its new plant, including the installation of latest equipment for plating, polishing and forging business.

LUMBERTON, N. C.—City plans election to vote on $65,000 bond issue for extensions and improvements to waterworks system and power plant.

WILMINGTON, N. C.—National Oil Co., First and Everett streets, Richmond, Va., plans construction of storage tanks, piers, and other equipment and facilities here.

KNOXVILLE, TENN.—J. T. Rich has established a brass, bronze and aluminum foundry at 310 Tenth street.

FT. WORTH—Ralston Purina Co., 835 South Eighth street, St. Louis, has awarded contract for an 8-story, 45 x 76 feet, plant addition, including new machinery and equipment, to C. M. Davis, Cotton Exchange building.

SAN ANTONIO, TEX.—Grayburg Oil Co., Maverick building, will install power equipment in proposed oil refinery on tract of land recently acquired at South San Antonio; a boiler plant is planned. (Noted March 28.)

TEAGUE, TEX.—City plans construction of electric light and power plant to cost $105,000.

WICHITA FALLS, TEX.—McMullen Grinder & Motor Works, 227 Indiana street, will probably award contract soon for the construction of first unit of plant addition, 1-story, 50 x 150 feet. Roberts & Smith are architects.

West Central

NEWTON, KANS.—City will soon award contract for the construction of a sewage disposal plant, including a pumping station.

NEWTON, KANS.—City will soon award contract for the construction of a sewage disposal plant including pumping station. Black & Veatch, Mutual building, Kansas City, Mo., are engineers.

WICHITA, KANS.—Supreme Propeller Co. is building a new plant here to take care of increased business.

WICHITA, KANS.—Swift Aircraft Co. has started construction on new plant additions. The present building, 50 x 150 feet, is to become the metalworking shop.

MONROE CITY, MO.—City plans expending $20,000 for improvements to electric power plant.

ST. LOUIS—South Side Machine Co., Henry Lindel president, 4016 Nebraska avenue, has awarded contract for construction of 1-story plant addition, 100 x 100 feet, to George Moeller, 3520 Itaska street. (Noted Feb. 21.)

New Construction and Enterprise

Recent Incorporations

CHICAGO—L. A. Perrl Trailer Automobile Co., 1207 South Michigan avenue, has been incorporated with 5000 shares no par value stock, to manufacture and deal in trailers.

CHICAGO—Green Flash Corp., 4806 St. Anthony's court, has been incorporated with 400 shares no par value stock, to manufacture and deal in machinery, fixtures, mechanical and electrical devices, by R. D. Smith.

CHICAGO—Art Forge Co., 346 East 115th street, has been incorporated with $2500 capital to manufacture and deal in hardware, art metals, and metal novelties by Arthur W. Young.

CHICAGO—Coleman Fireproof Door Co., 3727 North Western avenue, has been incorporated with $10,000 capital to manufacture and sell doors, frames, sills, hardware, etc., by R. A. Coleman.

CHICAGO—Ecker Metalizing Products Corp., 1442 West Van Buren street, has been incorporated with $5000 capital to deal in metals of all kinds by B. O. Cobb, George. Ecker, H. S. Spoden.

CHICAGO—Gem Auto Devices Co., 2016 West Lake street, has been incorporated with $100,000 capital to manufacture and sell automobile devices, accessories, parts, etc., by Edward N. Nockels, J. A. Woll.

CHICAGO—Nonpareil Mfg. Co., 8 South Dearborn street, has been incorporated with $100,000 capital to manufacture and deal in bearings, and repair, etc. by E. D. Norton, H. A. Badger.

CHICAGO—Tractor & Equipment Co., 561 West Van Buren street, has been incorporated with $25,000 capital to manufacture and deal in tractors, power plants, contractors' equipment, etc., by Stanley E. Bates, W. F. Hebard and others.

BOSTON—Walter S. Wood Co. has been incorporated with $10,000 capital to engage in metal finishing, electroplating mill, foundry and machinists' equipment, machinery and supplies, by Walter S. Wood, 15 Wharf street.

BOSTON—Royal Appliances Corp., 120 Harrison avenue, has been incorporated with 1000 shares no par value stock, to manufacture electric motors, and electric machinery, and equipment of all kinds, by Louis J. Rubenstein, 25 Schuyler street.

BOSTON—Worden, Holtz Co. has been incorporated with 10,000 shares no par value stock to manufacture merchandise, incidental to the operation or equipment of automobiles, and motor vehicles, including chains, wrenches, etc. J. P. Higgins, 31 Temple street, is treasurer.

WORCESTER, MASS.—George F. Blake Inc., 198 Mechanic street, has been incorporated with 5000 shares no par value stock, to deal in all kinds of steel, iron, heavy hardware and other metals.

DETROIT—Central Iron Foundry Co., 1026 Dime Bank building, has been incorporated with 1000 shares no par value stock, to deal in metal and foundry products by C. N. White, Grosse Point Shores.

DETROIT.—Singer Iron & Metal Co., 3315 Barlum Tower, has been incorporated with $50,000 capital to smelt, manufacture and deal in all metallic products, by Morris Singer.

DETROIT.—Electrodor Co. has been incorporated to manufacture and sell electro-mechanical door operators, by Glenn G. Hill, 7629 Fenkell avenue.

DETROIT.—Auto Car Carriers Inc., Union Trust building, has been incorporated with 1000 shares of no par value stock to manufacture and sell automobile parts, by George S. Haggarty.

DETROIT.—Velvet Power Brake Co. has been incorporated with $1000 capital to manufacture and sell automotive materials, by Joseph J. Roura Jr., and Jesse B. Brown, 7644 Woodward avenue.

JONESVILLE, MICH.—Independent Gas Cock Co. has been incorporated with $25,000 capital to manufacture brass parts for plumbing, etc. by W. S. Killam.

RIDGEFIELD, N. J.—Automatic Heating Equipment Corp. has been incorporated with $50,000 preferred stock and 3000 shares of common stock, by United States Corporation Co., New York.

BROOKLYN, N. Y.—Reliance Brass Foundry has been incorporated with $25,000 preferred and 500 shares of common stock by D. R. Bernstein, 233 Broadway, New York.

BUFFALO—Auto Coala Corp. has been incorporated with $50,000 preferred and 1000 shares of common stock to manufacture heating apparatus, by Persons & Blair.

BUFFALO—Buffalo Lamp & Mfg. Co. has been incorporated with 500 shares of common stock.

NEW YORK—Drawcut Shear Co. has been incorporated with $100,000 capital by S. G. DeKay, 16 East Fortieth street.

NEW YORK—Paramount Wire Co. has been incorporated with 545 shares of common stock by V. C. Cormier, 2 Rector street.

NEW YORK—Chayes Dental Instrument Corp. has been incorporated with $150,000 preferred and 1500 shares of common stock by M. C. Weisman, 1440 Broadway.

NEW YORK—Even-Heat Oil Burner Corp. has been incorporated with $750,000 capital by E. A. Brown, 2 Lafayette street.

NEW YORK—La Roe Aircraft has been incorporated with 2000 shares common stock by E. P. Barrett, Katonah, N. Y., to manufacture airplanes.

NEW YORK—Walker Steel Products Corp. has been incorporated with $10,000 preferred stock and 200 shares common stock by M. Altman, 280 Madison avenue.

NEW YORK.—New Process Gold Co. has been incorporated with $615,000 capital to manufacture machinery, by McKown & Condon, 165 Broadway.

CANTON, O.—Mansfield Lock Washer Co. has been incorporated with 250 shares no par value stock by E. A. McCuskey.

CHARLESTON—United Pipe & Supply Co. has been incorporated with $100,000 capital to deal in tools and machinery by H. B. Frizell, Ralph Haddox and R. E. Woodrum.

FORT WORTH, TEX.—Larrabee Machine Works Inc. has been incorporated with $60,000 capital by G. W. Larrabee.

New Trade Publications

STEEL PLATES—Moltrup Steel Products Co., Beaver Falls, Pa., has issued a pamphlet describing its flat steel plates for core, pattern and bottom plates. The plates may be obtained in any thickness and in any size or shape.

MACHINE TOOLS—Manning, Maxwell & Moore Inc., New York, has issued a booklet presenting a comprehensive description of its various and widespread activities. Work and production of its various subsidiaries is outlined.

INDIVIDUAL MOTORS—Hertzler & Zook Co., Belleville, Pa., has issued a bulletin showing some of its accomplishments in motorizing industrial plants. Its several forms of service are outlined and illustrations show results in specific cases.

TOOTH CHAMFERING MACHINE—City Machine & Tool Works, Dayton, O., in a current bulletin describes its machine for rounding or chamfering gear teeth so they may be meshed silently and with a minimum of wear. Illustrations and specifications present the details.

AIR COMPRESSORS—Sullivan Machinery Co., Chicago, manufacturer of air compressors and other equipment, has prepared a bulletin on diesel drive for angle-compound air compressors. Illustrations show diesel engine compressor plants for various uses, mining, construction and industrial.

ROLLED METALS—Tauton-New Bedford Copper Co., Tauton, Mass., describes and illustrates in a current bulletin some of the advantages claimed for rolled metals because of lack of corrosion. Operations involved in the production of a finished piece are illustrated.

GRINDING EQUIPMENT — Norton Co., Worcester, Mass., has issued a 15-page booklet on high speed snagging equipment. The pamphlet describes two types of grinding wheels and gives the advantages of the floor stand and swing frame grinders. It is illustrated with views of various types of grinding machines.

SPIRAL CONVEYORS—Weller Mfg. Co., Chicago, has issued a catalog of its spiral conveyors and accessories. Illustrations cover numerous installations for various purposes, varying types of conveyors, hangers, bearings, drives and other details. Data are given in numerous tabulations.

APPRENTICE TRAINING—Pettibone-Mulliken Co., Chicago, has circulated a booklet on its student training courses. The booklet tells of the advantage of learning a trade and gives the schedules for the various courses offered. A short story gives a description of the trades the company has to offer the apprentice. Photographs show views of different departments in the plant.

STEEL CASTING—Sivyer Steel Casting Co., Milwaukee, devotes the current number in its series of reports to the means devoted to obtaining uniform dependability in castings. Production and quality control, with particular attention to the variables is emphasized. This consists of establishing channels in which experienced, informed intelligence can and must function effectively and unfailingly.

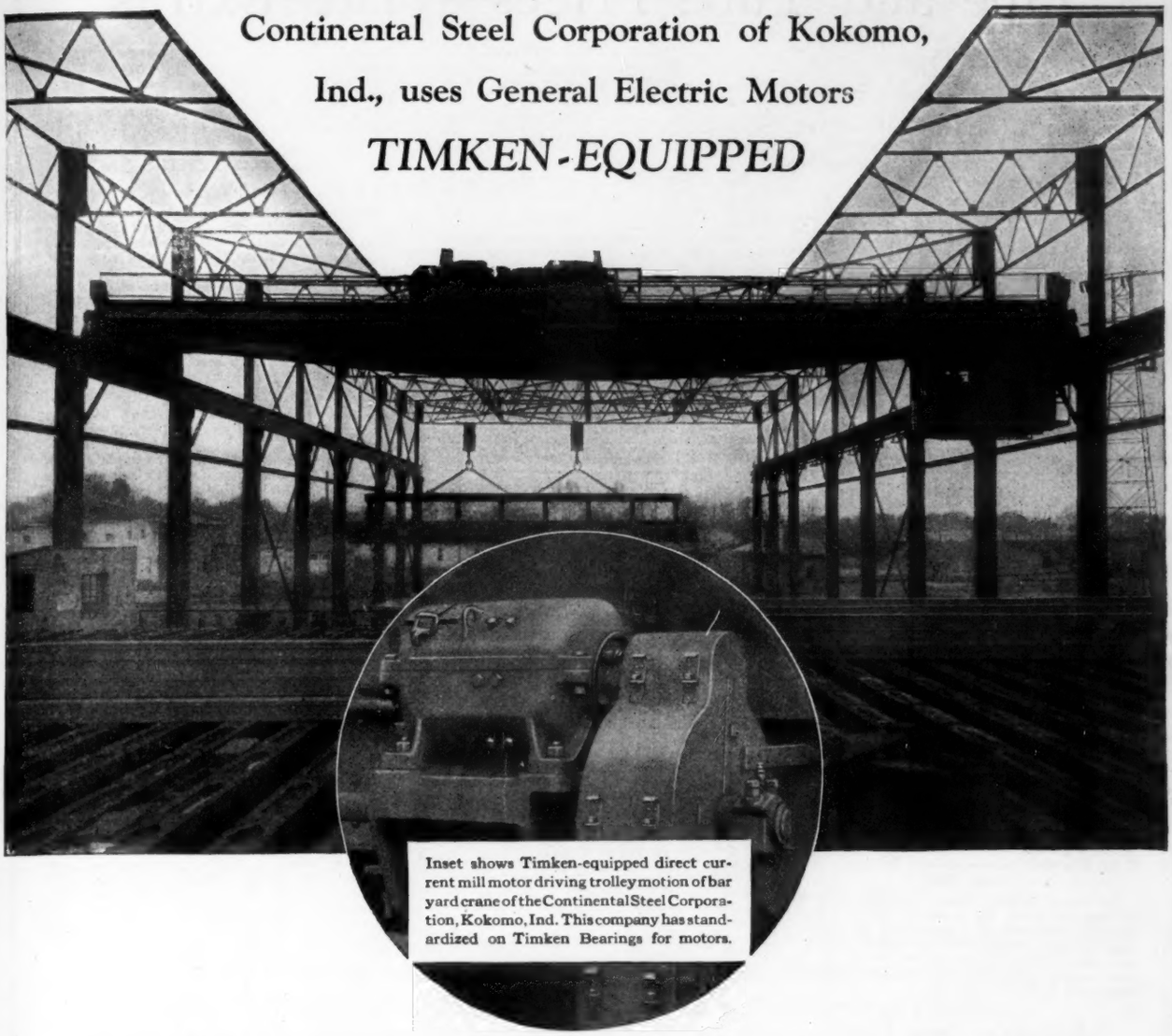
CONVEYORS—In a 20-page bulletin by the Mathews Conveyor Co., Ellwood City, Pa., various conveyor systems are described. It contains a discussion of conveyor systems and their adaptability to various types of foundries. The bulletin is illustrated by reproductions from photographs of installations in various types of foundries. Drawings of several installations are included, with discussions of construction features of the company's types of gravity roller conveyors.

CONVEYING EQUIPMENT—Richards-Wilcox Mfg. Co., Aurora, Ill., has issued a catalog of its conveying equipment. The catalog describes and illustrates its various carrier systems, turntables, cranes, methods of support, trolleys, hoists and scales. Types of buckets and material handling apparatus also are described and illustrated. Specifications and price lists accompany the description of the equipment. A list is given of the users of this company's equipment.

ANOTHER MILL GOES TIMKEN

Continental Steel Corporation of Kokomo, Ind., uses General Electric Motors

TIMKEN-EQUIPPED



Inset shows Timken-equipped direct current mill motor driving trolley motion of bar yard crane of the Continental Steel Corporation, Kokomo, Ind. This company has standardized on Timken Bearings for motors.

Shorts, burnouts, improper alignment and shutdowns cannot be tolerated in these days of production pressure.

Timken Bearings do away with all these hazards. Sealed in leak-proof closures, shutdowns and burnouts due to oil soaked windings just do not exist. And Timken rigidity holds rotors in line *to stay*.

With Timken-equipped mill motors, friction becomes anti-friction, lubricant is saved, and service is prolonged. Size for size, and area for area, Timken Bearings have the greatest carrying capacity for both radial and thrust loads. All of these advantages drive operating costs down and down and down. It is all the result of the exclusive Timken combination of tapered design, *POSITIVELY ALIGNED ROLLS*, and Timken electric furnace steel.

The modern way in this new day of production is to substitute Timken-equipped machinery without delay and get these extra advantages.

THE TIMKEN ROLLER BEARING CO.
CANTON, OHIO

TIMKEN *Tapered Roller* BEARINGS

Pipe and Tube Prices—Plate Extras

Steel Pipe

Pittsburgh and Lorain basing discounts, jobber's carloads.

Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount.

Chicago takes differential 2½ points less than Pittsburgh-Lorain basis.

Butt Weld

	Black	Galvanized
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½

Lap Weld

2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½

REAMED AND DRIFTED

Butt Weld

1 to 3-inch	60	48½

Lap Weld

2-inch	53	41½
2½ to 6-inch	57	45½

EXTRA STRONG—PLAIN ENDS

Butt Weld

⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½

Lap Weld

2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½

DOUBLE EXTRA STRONG

Butt Weld

½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½

Lap Weld

To large jobbers these discounts are increased on black by 1 point and a supplementary discount of 5 per cent; on galvanized by 1½ points with a supplementary 5 per cent. Extra 5 per cent granted in the 4th quarter 1927 and 1st quarter 1928 discontinued April 2, 1928.

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers' carloads. Individual quotations made on delivered basis.

THREADS AND COUPLING

Butt Weld

	Black	Galv.
¼ and ⅜-inch	+11	+36
½-inch	23	5
¾-inch	28	11
1 and 1¼-inch	31	15
½ and 2-inch	35	18

Lap Weld

1¼ and 1½-inch	Upon application	
2-inch	23	9
2½ to 3½-inch	28	12
4 to 6-inch	30	17
7 and 8-inch	29	16
9 to 12-inch	26	11

REAMED AND DRIFTED

2-inch to 6-inch—Two points less than above

EXTRA STRONG, PLAIN ENDS

¼ and ⅜-inch	+13	+48
½-inch	23	7
¾-inch	28	12
1 to 2-inch	34	18

Lap Weld

2-inch	29	13
2½ to 4-inch	34	20
4½ to 6-inch	33	19
7 and 8-inch	31	17
9 to 12-inch	21	8

DOUBLE EXTRA STRONG

Butt Weld

½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39

Lap Weld

2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	

Jobbers obtain additional preferential discounts of 1, 5 and 2½ on black and galvanized wrought iron pipe.

On extra or double extra strong pipe fitted with threads and couplings basing discount lowered 5 points from plain end price. Fitted with threads only, basing discount lowered 3 points for random lengths.

Boiler Tubes

Pittsburgh carload discounts

STEEL (Lap Weld)

2 and 2¼-inch	40 off
2½ and 2¾-inch	48 off
3-inch	54 off
3¼ to 3¾-inch	56 off
4-inch	59 off
4½ to 6-inch	48 off

Subject to two 5 per cent discounts on full carload shipments. On less than 10,000 pounds, base discount reduced 6 points and one 5 per cent allowed. On 10,000 pounds to carload, base discount reduced 4 points and two 5 per cents allowed.

CHARCOAL IRON

1½-inch	1 off
1¾-inch	8 off
2 and 2¼-inch	13 off
2½ and 2¾-inch	16 off
3-inch	17 off
3¼ to 3½-inch	18 off
4-inch	20 off
4½-inch	21 off

Subject to 10 per cent discount on full carload lots. On less than 10,000 pounds, base discount reduced 2 points and no preferential allowed. On 10,000 pounds to carload, 5 per cent preferential allowed.

SEAMLESS COLD DRAWN

1-inch	63 off
1¼ and 1½-inch	55 off
1¾-inch	39 off
2 and 2¼-inch	34 off
2½ and 2¾-inch	42 off
3-inch	48 off
3¼ and 3½-inch	50 off
4-inch	53 off
4½, 5 and 6-inch	42 off

SEAMLESS HOT ROLLED

1¾-inch	39 off
2 and 2¼-inch	40 off
2½ and 2¾-inch	48 off
3-inch	54 off
3¼ and 3½-inch	56 off
4-inch	59 off
4½, 5 and 6-inch	48 off

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed.

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts on New List July 1, 1925

Carbon 0.10 to 0.30 per cent.....50 to 55 off
Carbon 0.30 to 0.40 per cent.....45 to 50 off

Plus usual extras for forming and for long lengths over 18 feet and for commercially exact lengths.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	14¼c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	**12-gage**	**16c**
2¼-inch	11-gage	17c
2¼-inch	10-gage	18c
3-inch	7-gage	33c
5⅜-inch	9-gage	50c
5½-inch	9-gage	52c

Plus usual extras for forming and for lengths over 24 feet.

Plate Extras

BASE

Rectangular plates, tank steel or conforming to manufacturers' Standard Specifications for structural steel, date Nov. 24, 1922, or equivalent, ¼-inch thick and over on thinnest edge (except for ¼-inch or 72 inches wide when ordered to weight in pounds per square foot—see width and gage extras), 100 inches wide and under, down to but not including 6 inches wide, 5 feet 0 inches long up to published limit in length but not over 80 feet 0 inch, are base. Extras per pound for width or diameter.

All Plates Rectangular or Otherwise

¼-inch thick and heavier, but not less than 11 pounds per square foot, if ordered to weight.

Over 100 to and including 110 inches	.05c
Over 110 to and including 115 inches	.10c
Over 115 to and including 120 inches	.15c
Over 120 to and including 125 inches	.25c
Over 125 to and including 128 inches	.50c

Plates less than ¼-inch or lighter than 11 pounds per square foot.

Over 72 to and including 84 inches	.10c
Over 84 to and including 96 inches	.20c
Over 96 to and including 100 inches	.30c

Over 100 inches add .35c to width extras for plates ¼-inch thick and heavier.

GAGE

Plates Not Exceeding 72 Inches Wide

Plates less than ¼-inch gage, to and including 7/16-inch; or lighter than 10.2 pounds per square foot, to and including 7.65 pounds square foot..... .20c

Plates Over 72 Inches Wide

Plates less than ¼-inch gage, to and including 7/16-inch; or lighter than 11 pounds per square foot, to but not including 7.65 pounds square foot.... .20c
Plates ordered 7.65 pounds square foot .30c

QUALITIES

Pressing steel	.10c
Flange steel (boiler grade)	.15c
Ordinary firebox steel	.20c
Stillbottom steel	.30c
Locomotive firebox steel	.50c
Marine steel	1.50c
Hull materials subject to U. S. Navy Dept. specifications for medium or soft steel	.10c
High tensile hull steel subject to U. S. navy department or equivalent specifications	1.00c
Boiler steel subject to U. S. navy department specifications, classes A-B	1.50c

Hull plates to hull specifications, required to stand cold flanging, take extra for flange steel.

Floor Plates

Checkered plates 1.75c

Checkered plates are not furnished to sketch and are rolled from "Stock Steel" only. No physical tests will be made on checkered plates.

INSPECTION

Mill inspection .....No extra

Charges for other inspection, such as Lloyd's or American bureau of shipping, will be made by inspection bureau direct to buyer.

CUTTING

LENGTH OR DIAMETER

All Plates, Rectangular or Otherwise

Five feet and over up to published limit of length, but not over 80 feet	No extra
Under 5 feet to 3 feet inclusive	.10c
Under 3 feet to 2 feet inclusive	.25c
Under 2 feet to 1 foot inclusive	.50c
Under 1 foot	1.55c
Over 80 feet to 100 feet inclusive	.10c

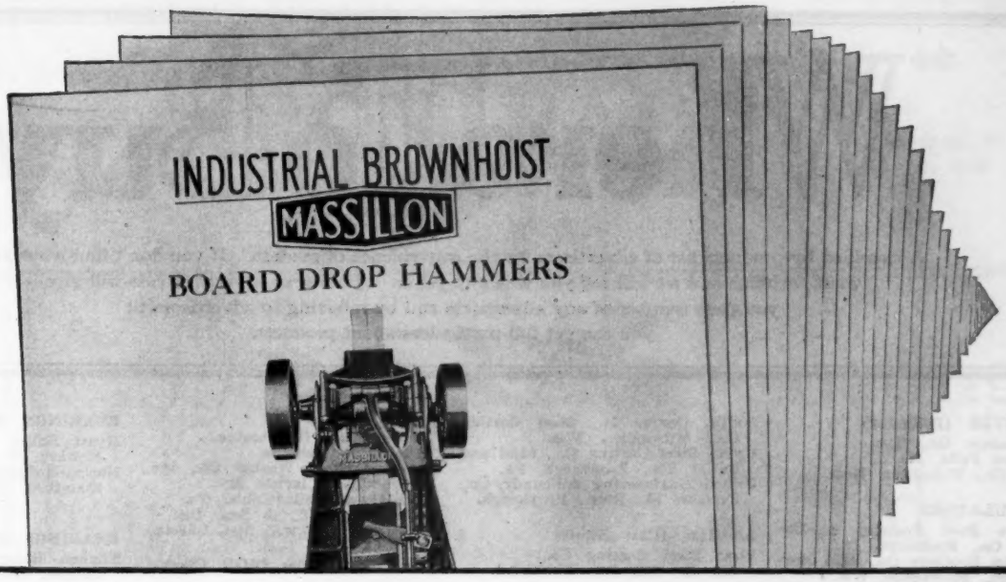
Over 100 feet add .25c plus .05c for every additional 2 feet or fraction thereof.

Regular Sketches

With not more than four straight cuts. (Including straight taper plates)
Additional extra ..... .10c

Irregular Sketches

With not more than four straight cuts. (Sketches cannot be sheared with re-entrant angles)
Additional extra ..... .20c



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The reputation for quality built up by Industrial Brownhoist during the past half century stands behind the new line of Massillon Hammers now being manufactured by this corporation.

In order to better acquaint you with these hammers, we have recently published a set of bulletins which illustrate and describe the different types. Any one or a full set of these bulletins will be sent you, if you will kindly use the coupon below to designate the ones in which you are interested.

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District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, New Orleans, San Francisco.

Plants: Brownhoist Division, Cleveland; Industrial Division, Bay City, Michigan; Elyria Foundry Division, Elyria, Ohio.

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Kindly favor us with Bulletins of Industrial Brownhoist Massillon Hammers, as checked off below.

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No. 229 Double Frame Steam Drop Hammers —
No. 329 Single Frame Steam Drop Hammers —
No. 429 Board Drop Hammers . . . —

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American Chemical Paint Co., Ambler, Pa.

ADAMITE ROLLS
American Adamite Co., The, 410 Oliver Bldg., Pittsburgh, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

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Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Vanadium Corp. of America, 120 Broadway, New York City.

ALUMINUM
Summerill Tubing Co., Bridgeport, Pa.

ALUMINUM (Vanadium)
Vanadium Corp. of America, 120 Broadway, New York City.

ALUMINUM BRONZE (Acid Resisting)
Duriron Co., Inc., The, Dayton, Ohio.

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ANNEALING BOXES
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Petroleum Iron Works Co., The, Sharon, Pa.
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Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh.

ANVILS (Cast Steel)
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

APPRAISALS
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.

ARCHES (Suspended)
Detrick, M. H., Co., 140 S. Dearborn St., Chicago, Ill.

ARCHITECTS (Industrial)
Austin Co., The, 16112 Euclid Ave., Cleveland, O.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Champion Machine & Forging Co., 3675 E. 78th St., Cleveland.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.

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Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Williams Alloy Products Co., The, Elyria, Ohio.

BALING PRESSES
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BARRELS (Steel)
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Central Alloy Steel Corp., Massillon, O.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.

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American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
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Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Franklin Steel Works, Franklin, Pa.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Migret, Rene, 7 Boulevard DeFontaine, Charleroi, Belgium.
Nicetown Plate Washer Co., Inc., Juaniata & Clarissa Sts., Nicetown, Philadelphia, Pa.
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Bliss & Laughlin, Inc., Harvey, Ill.
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Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Pacific Coast Steel Co., Hunter-Dulin Bldg., San Francisco, Calif.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Tennessee Coal, Iron & Railroad Co., 1351 Brown-Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

BEAMS, CHANNELS, ANGLES, ETC.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Migret, Rene, 7 Boulevard DeFontaine, Charleroi, Belgium.
Phoenix Iron Co., The, 20 So. 15th, Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.

BEARING METAL
Williams Alloy Products Co., The, Elyria, Ohio.

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Norma-Hoffmann Bearings Corp., Stamford, Conn.

BEARINGS (Journal)
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Timken Roller Bearing Co., The, Canton, O.
Williams Alloy Products Co., The, Elyria, Ohio.

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Hyatt Roller Bearing Co., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

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Hyatt Roller Bearing Co., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

BEARINGS (Tapered Roller)
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Thrust)
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., The, Canton, O.

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Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Hinman, D. A., & Co., Sandwich, Ill.
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Long & Allstatter Co., Hamilton, O.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., The, Union Trust Bldg., Pittsburgh, Pa.

BILLETS (Alloy and Carbon Steel)
Central Alloy Steel Corp., Massillon, O.
Hausman & Wimmer Co., The, Clark Bldg., Pittsburgh, Pa.
Washburn Wire Co., Phillipsdale, R. I.

BILLETS (Die Stock Steel)
Hausman & Wimmer Co., The, Clark Bldg., Pittsburgh, Pa.

BILLETS (Forging)
Bethlehem Steel Co., Bethlehem, Pa.
Central Alloy Steel Corp., Massillon, O.
Erie Forge Co., Erie, Pa.
Hausman & Wimmer Co., The, Clark Bldg., Pittsburgh, Pa.
Heppenstall Forge & Knife Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Wood, Alan, Steel Co., Conshohocken, Pa.

BILLETS (Forging, Alloy Steel)
Bethlehem Steel Co., Bethlehem, Pa.

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